# THE IRON TRADE REVIEW

Volume XLIII CLEVELAND, DECEMBER 17, 1908 Number 25

## FOREIGN ORE

### PURCHASED BY EASTERN BLAST FURNACE INTERESTS.

**Burlington Places Rail Order—New York Central Figuring on Cars—American Car & Foundry Co. Inquires for Pig Iron.**

Eastern furnace interests have purchased a large tonnage of foreign ore for 1909 delivery. Most of this ore will come from Spain, but some will be shipped from Nova Scotia. The purchases amount to about 600,000 tons of foreign ore, and there has also been considerable trading in local ores in the east, consumers figuring that they can get foreign and local ores at somewhat lower prices than Lake Superior ores can be delivered.

**Pig Iron Market**

Sales of pig iron have been very moderate, including 15,000 tons of basic for the Philadelphia district. An inquiry for 8,000 tons has been sent out by the American Car & Foundry Co., at St. Louis, for the Detroit plant, calling for 5,000 tons of gray forge, 2,000 tons of No. 2, and 1,000 tons of No. 1, deliveries to be from March to June. One large eastern interest has over 100,000 tons of orders on its books taken since the election, and several others have tonnages of fully half that amount. On account of the heavy sales made, furnaces generally are very firm in their views as to sales for the second half of the year.

**Railroad Buying**

The first important order for steel rails to be recorded is that of the Chicago, Burlington & Quincy, for 40,000 tons, of which 30,000 will be rolled by the Steel Corporation, and 10,000 by the Colorado Fuel & Iron Co. The buying of track fastenings continues at a heavy rate, and the aggregate since Nov. 15 is fully 300,000 kegs. The New York Central is understood to be figuring on 30,000 cars; the Carolina, Clinchfield & Ohio has ordered 2,250 steel gondolas from the Pressed Steel Car Co., and the Pittsburg & Lake Erie has contracted for 500 steel hoppers from the Standard Steel Car Co., and five locomotives from the American Locomotive Co.

**Structural Material**

Contracts for structural material have not been numerous, the principal awards being the Denver viaduct, 4,000 tons; Kansas City viaduct, 700 tons, and the Henry building, Seattle, 1,000 tons. One contract for 7,500 tons of cast iron pipe for Amsterdam, N. Y., has been taken by the leading interest.

**Coke and Old Material**

Rain has greatly improved conditions in the coke regions. Some contracts for foundry coke are being made, including one for 4,000 tons for the full year, at $2.50 per ton. The discovery that late in November an eastern concern bought 25,000 tons of heavy steel at about $17 delivered has caused some excitement in the old material market in that section. In some other centers, scrap shows a tendency toward weakness.

### PITTSBURG BRIEFS.

(Special Telegram.)

Pittsburg, Dec. 16.—It is estimated that tin plate shipments for 1908 will be 90 per cent of last year.

It is officially denied by the National Tube Co. that a new blast furnace will be erected at the Benwood group at Wheeling.

The American Sheet & Tin Plate Co. this week is operating 101 sheet mills and 136 tin mills.

Spot iron sales have been made at $16.75 delivered Pittsburg.

The Norfolk Iron Co. has just begun operating the first rolling mill at Norfolk, Va.

## SCHWAB TESTIFIES,

### TELLING OF INCREASED COST OF MAKING STEEL RAILS.

**Explains Letter to Frick — Predicts Passing of Bessemer Process—Duty on Pipe and Ferro Discussed.**

(Special Telegram.)

Washington, D. C., Dec. 15.—Before the ways and means committee of the House of Representatives, Charles M. Schwab, Tuesday, effectually explained away the seeming inconsistencies between present tariff contentions of the steel industry and the statements in his much-discussed letter written in 1899 as president of the Carnegie Steel Co. to Henry C. Frick. Mr. Schwab occupied the stand and gave sworn testimony for about three hours and made a most effective witness for the industry. Asked his connection with the Bethlehem Steel Corporation, he replied that he was so unfortunate as to be a stockholder, as well as president. His statements were entirely in reply to questions.

The essence of the Frick letter was this statement: "You know we can make rails for less than $12 a ton."

"That letter was then substantially true," said Mr. Schwab. "But it was written by an optimistic and enthusiastic young man seeking preferment and was entirely from the view-point of the manufacturer. It includes all actual manufacturing costs, but did not include charges for depreciation, interest, selling, administration, etc. Mr. Frick wanted to dispose of his interests and the letter was at his solicitation.

"Then we leased ores in the northwest at 10 to 15 cents a ton; surface mined on the Mesabi at 15 to 25 cents; hauled it to the lakes at 60 or 70 cents; had a lake freight of 60 cents; and got it to Pittsburg for 70 cents, a total delivered price of $2.40 per ton of 58 per cent ore, or, allowing for losses, $4.50 ore charges for a ton of iron. Coke expense was $1 a ton, with 75 cents freight, and one

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# THE WEEK IN IRON CENTERS

## PITTSBURG.

### Pig Iron Quiet, but Prices Are Firm—General Outlook Good.

Office of THE IRON TRADE REVIEW,
510 Park Bldg., Dec. 15.

With the end of the present rather unsatisfactory year in sight, iron and steel makers are recovering a good portion of their former optimism and are preparing to start the new year with confidence. A survey of the market at this time shows it to be quiet and somewhat uneventful, but through it all there is a strong undertone that is accepted as holding forth favorable promises for the future. Conditions have improved by a slow and measured process to their present point and it is universally believed that the change is permanent, since it is evident that the whole atmosphere of the industry has been clarified in marked contrast to the general uncertainty of one year ago.

Specifications coming to the mills in December are probably lighter than in a corresponding period in November. This state of the market is not unexpected, since there is normally a slowing up of trade activity at this stage of the year. Though anticipation is keen, official statements of actual rail buying for 1909 are still lacking, but all indications point to its being made before many days shall have elapsed. The pig iron market is quiet, but encouragement is found in the firmness of its advanced prices. Some additional buying of steel cars came within the week, including 500 large hopper cars by the Pittsburg & Lake Erie railroad and 800 ore cars by the Duluth & Iron Range railroad.

The resumption of work by the Jones & Laughlin Steel Co. upon its additional Talbot continuous open-hearth furnaces at its South Side Works, Pittsburg, is taken as an indication of the clearer outlook for the future before makers. Active construction upon this improvement was suspended about one year ago, when business conditions became unpromising, and practically no work has been done upon it all year.

**Pig Iron.**—The pig iron market is exceedingly quiet, but there is a firmness in prices that is giving the situation a good tone and is lending encouragement to the furnaces as to future prospects. The present conditions are expected to continue until after the first of the year and it is anticipated the buying activity will then be considerably enlarged.

Foundry iron has stiffened slightly in that minimum prices are more exceptional and average sales are well around $15.75 furnace, although higher figures have been commanded in frequent instances. A sale of 150 tons of No. 2 for prompt shipment was made at $15.75 valley or $16.65 Pittsburg, and several hundred tons of No. 2 for December brought $15.90 valley or $16.80 delivered. Some furnaces with freight advantages have been making sales at $16.50 delivered.

In basic the situation has been somewhat disturbed by middlemen, who, upon being obliged to take out last quarter tonnage contracted for prior to the election, are showing a willingness to undersell the general level and still realize good profits for themselves. This competition is more marked in the present quiet market, but it is necessarily very limited. An ingot mold interest took about 1,000 tons of basic and Bessemer for first quarter at respective prices of about $15.50 and $16.50 valley. The Bessemer market is quoted from $16.50 to $17 valley. Malleable holds from $15.75 to $16 furnace.

The Shenango Furnace Co. will blow out its No. 3 stack at Sharpsville about the first of the year and practically rebuild it to a mechanically-filled furnace of about 350 tons daily capacity. The preliminary improvements are now under way, but the furnace is still in operation.

The southern market is very strong, with No. 2 at $13 Birmingham. Some of the large makers are exercising a cautious policy, preferring not to take on large additional lots at present, and the attitude is regarded as being rather significant. On prompt and first quarter delivery on northern iron, we quote as follows:

| | |
|---|---|
| Bessemer, valley | $16.50 to 17.00 |
| Bessemer, Pittsburg | 17.40 to 17.90 |
| No. 1 foundry, Pittsburg | 16.90 to 17.40 |
| No. 2 foundry, Pittsburg | 16.25 to 16.90 |
| Gray forge, Pittsburg | 15.40 to 15.90 |
| Basic, valley | 15.50 to 16.00 |
| Basic, Pittsburg | 16.40 to 16.90 |

**Ferro-Alloys.**—Firmer prices are ruling in ferro-alloys and the market has good undertone. The inquiry is fair. A typographical error in last week's report relative to the sale of 1,000 tons of ferro-manganese to a local steel interest made the price read about $44 delivered, when it should have been about $44 seaboard, or about $46 delivered. It is understood this sale was made approximately at this or a little higher figure. We quote 80 per cent ferro-manganese at $44.50 to $45.50 Baltimore, with a freight rate of $1.95 to Pittsburg.

Imported 50 per cent ferro-silicon is quoted $64 Pittsburg on forward deliveries; domestic 12 per cent, $28; 11 per cent, $27; 10 per cent, $26, Pittsburg. Imported lower grades of ferro-silicon range lower than domestic.

**Iron Skelp.**—Prices have materially stiffened and some makers are quoting grooved iron skelp at 1.90c Pittsburg and sheared iron skelp at 1.95c Pittsburg, but are not inclined to sell for extended deliveries at these prices. A sale of 500 tons of sheared skelp was made the past week at 1.90c delivered this district.

**Sheets.**—A fair amount of contracting is under way for future requirements, but specifications at present are not as heavy as they are expected to be after January. The mills are now working up tonnage in anticipation of these shipments. The American Sheet & Tin Plate Co. has 59 per cent of its capacity going this week against 56 per cent last week, the increase being in scattered mills. Price concessions are seldom heard of at present. We quote official prices as follows:

Blue annealed sheets, No. 10 and heavier, 1.80c; Nos. 11 and 12, 1.85c; Nos. 13 and 14, 1.90c; Nos. 15 and 16, 2c; box annealed, Nos. 17 to 21, 2.25c; Nos. 22 to 24, 2.30c; Nos. 25 and 26, 2.35c; No. 27, 2.40c; No. 28, 2.50c; No. 29, 2.60c; No. 30, 2.70c; galvanized sheets, Nos. 10 and 11, 2.45c; Nos. 12 and 14, 2.55c; Nos. 15 and 16, 2.65c; Nos. 17 to 21, 2.80c; Nos. 22 and 24, 2.95c; Nos. 25 and 26, 3.15c; No. 27, 3.35c; No. 28, 3.55c; No. 29, 3.70c; No. 30, 2.95c; corrugated roofing, $1.75 per square for No. 28 painted, 2½-inch corrugation, and $3.10 per square on galvanized roofing, 2½-inch corrugation, No. 28.

Jobbers are allowed $1 a ton from these prices.

**Tin Plate.**—Outside of two or three interests, the tin plate requirements of the salmon packers along the Pacific coast have been placed under contract. The canners generally have been buying quite freely, as they are expected to start their can plants early in the year to prepare for the coming season's crops. The leading interest continues to operate at 56 per cent of capacity. The LaBelle works, 10 mills, Wheeling,

is scheduled to start Jan. 4. We quote official prices:

Coke tin plate, 100-pound basis, 14 x 20, $3.70 f. o. b. mill Pittsburg district. Terms, 30 days, less 2 per cent for cash in 10 days.

**Plates.**—The railroads continue to place steel car orders. The Pittsburg & Lake Erie railway has awarded 500 steel 100,000 pound hopper cars to the Standard Steel Car Co., and the steel material including the plates, about 6,000 tons, will be furnished by the Carnegie Steel Co. This order is an addition to the 1,500 steel gondolas recently given the American Car & Foundry Co. by this road. The Pittsburg & Lake Erie has also contracted for five passenger locomotives from the American Locomotive Co. Work on the 800 steel ore cars of the Duluth & Iron Range railroad, which will be built by the Standard Steel Car Co., upon designs of the Summers Steel Car Co., is expected to be done at the Hammond plant. In this event the 8,000 tons of plates required will be supplied by the Illinois Steel Co. Since the car buying movement was inaugurated, the Pressed Steel Car Co. has booked about 7,000 cars, which insures full capacity of its plants for about three months. Plate specifications coming to the mills are holding up quite well, and operating schedules are good. There is shading on the lighter gages. We quote official prices:

Tank plate, ¼-inch thick, 6¼ to 100 inches, 1.60c f. o. b. mill Pittsburg. Extras are as follows per 100 pounds; Boiler and flange steel plates, 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½-inch to and including 3/16-inch plate on thin edges, 0.10c; under 3/16 to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

**Rails and Track Material.**—Formal announcements of rail contracts booked for 1909 delivery including that of the Pennsylvania railroad for 160,000 tons are still withheld, but makers state these will be forthcoming in a short time. The Pennsylvania railroad has issued an official statement to the effect that the order for its rails has not been placed, and that reports to the contrary are premature. The traction lines are buying rails more freely, and the Carnegie Steel Co. has booked a number of contracts of this sort, none of which exceed 1,000 tons. One order of 700 tons of 60-pound sections is noted. The Wheeling & Lake Erie railroad order of 3,500 tons for prompt shipment was rolled this week at the Edgar Thomson works. A favorable tonnage in light rails was taken this week. The rerollers are selling at $3 to $4 a ton under official quotations, and this competition is being met by the mills rolling from billets. On present specifications on Bessemer rails we quote officially as follows, the base price for open-hearth rails being $30 mill:

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; 8-pound, $36; 12-pound, $32; 16-pound, $30; 20-pound, $29; 25 to 45-pound, $28; angle splice bars for standard sections, $1.65; standard spikes, $1.70 to $1.80 Pittsburg; hand spikes, $1.80 to $1.90 Pittsburg.

**Steel.**—Consumption of steel is increasing and good specifications against standing contracts are reported by the mills. New business is meager. The tonnage moving in sheet and tin bars is also larger.

Bessemer and open-hearth billets, base sizes, are quoted at $25 Pittsburg, and forging billets at $27 Pittsburg, subject to the division of the freight charge over $1 and not exceeding $3, and sheet and tin bars at $27.50 Pittsburg, valley and Wheeling territory, and $27 Pittsburg for delivery to other points.

**Hoops and Bands.**—The hoop and band market has been more or less unsettled by the temperance agitation in many sections, and the requirements of coopers and distillers for this material are expected to be affected accordingly. Present year contracts are about to expire, and bookings for 1909 will be made soon. The prices to govern these contracts are fixed as quoted. Official prices are:

Hoops in carload lots, 1.80c; in less than carload lots, 1.90c; bands, 1.40c, base half extras as per standard steel.

**Merchant Bars.**—Bar iron makers acting independently are raising prices in different districts, bringing them to about the equivalent of the 1.50c base now prevailing in the Pittsburg territory. The high price of scrap has promoted this action. Steel bar specifications in December are less than in November, but there is a fair run of mill orders coming in. It is estimated that steel bar consumption in the United States in 1908 will be less than 50 per cent of normal. We quote official prices as follows:

Common iron bars, 1.50c Pittsburg in carload lots and over; 1.55c in less than carloads; 1.42c to 1.45c base Pittsburg, plus freight to point of shipment on western deliveries; Bessemer and open-hearth steel bars, 1.40c; plow and cultivator, 1.40c; channels, angles, zees, tees, under three inch, 1.50c, all f. o. b. Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds, 0.10c advance; less than 1,000 pounds of a size, 0.30c advance. Cold rolled and ground shafting, 57 per cent in car loads, and 52 per cent in less than carloads, delivered in base territory; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flats, 1.60c to 1.65c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.10c to 2.15c. Planished and machine straightened tire steel is 1.60c base. Iron finished tire under 1½ by ½ inches, 1.55c, plus ½ extra on tire card; iron finished tire, 1½ by ½ and over, 1.40c; plus ½ extra on the steel bar card.

On cold rolled strip steel, width 1½ inches and wider, and 0.100 inch and thicker, we quote base prices per 100 pounds, $3.35 on hard, and $3.60 on soft.

**Structural Material.**—Conditions in structural lines from a fabricating standpoint are quiet, and new work appearing is not heavy. The railroads are presenting few jobs at this period, but not much work is expected from this source until after the first of the year. The recently organized association of steel fabricators is expected to improve conditions in the trade. Low prices are still encountered, several recent instances of note being in the east. The shape mills are operating at fair schedules. Bids for the general construction of the new plant of The Crane Co., at Oakmont, Pa., have gone in at Chicago. Two buildings 100 x 320 feet each in dimensions, of brick and heavy steel construction and with interior craneways, etc., will be erected, requiring about 600 tons of steel. The new West Pennsylvania hospital projected by this city is expected to soon come in the market, and this contract will require considerable tonnage. We quote official prices as follows:

Beams and channels, 15-inch and under, 1.60c; over 15 inches, 1.70c; zees, 1.60c; tees, 1.65c; angles from

3 to 6 inches, 1.60c; over 6 inches, 1.70c; universal and sheared plates, 6¼ inches and wider, 1.60c base.

**Merchant Pipe.**—The general tone of the market is quiet owing to the seasonable effect, but the situation is quite satisfactory to manufacturers. The mills are working on accumulated business, and current specifications are fair, so that operations are being well maintained. Several recent inquiries of note in the market have not been closed. Iron pipe prices are stronger generally, and are now being well maintained owing to the advances in forge iron and semi-finished material. We quote the following official base discounts with an additional one point and five off to jobbers:

| | —Steel— | | —Iron— | |
|---|---|---|---|---|
| | Black. | Galv. | Black. | Galv. |
| ¾ to 6 inches.... | 75 | 65 | 73 | 63 |

**Boiler Tubes.**—Little activity is noted in the boiler tube market and conditions may be said to be very quiet. Prices on both iron and steel tubes are firmer and the official level is being well upheld. We quote the following official base discounts to the general trade on base sizes:

BOILER TUBES.

| | Iron. | Steel. |
|---|---|---|
| 2¼ to 5 inches..... | 52 | 65 |

**Wire Products.**—The wire situation is very satisfactory with the exception of electrical goods, and this line is expected to show improvement soon. New business is rather light at this period, but specifications are coming in very freely. The report that wire producers are about to meet to take action on prices is not confirmed in this territory. Official prices on wire products are as follows:

Wire nails, jobbers' carload lots, $1.85; retailers' carload lots, $2; painted barb wire, jobbers' carload lots, $2.10; retailers' carload lots, $2.15, with 30c for galvanizing; plain wire to jobbers in carloads, 1.80c; and to retailers in carloads, 1.85c.

**Wire Rods.**—The inquiries for rods which have been in this market for the past several weeks are still open. Prices are firmer. We quote $33 Pittsburg on Bessemer, and $34 Pittsburg on open-hearth rods.

**Coke.**—Improved conditions relative to the water supply for operations in the Pennsylvania coke regions are apparent. Some operators who have been hauling water to their works for months have discontinued this expedient and most companies are in more comfortable positions as to maintaining full operations if the market justified them in so doing. Spot furnace coke is being offered a little more freely as a result, but there is no material change in prices and we quote this market from $1.75 to $1.85 ovens, some sales of the week being at $1.80 ovens. For future shipment, standard furnace coke is held at $1.90 to $2 ovens. Some foundry coke contracts are being closed, and we note a sale of 4,000 tons for the full year at $2.50 ovens. A little last half tonnage has been booked at $2.60 ovens. We quote the forward market on standard foundry coke at from $2.25 to $2.50 ovens, with spot coke ranging from $2.10 to $2.35 ovens. For the week ending Dec. 5, the *Courier* shows 20,357 ovens active, 17,493 ovens inactive, with an output of 235,211 tons as compared with 19,829 ovens active, 18,191 ovens inactive and an output of 229,199 tons the previous week.

**Old Material.**—There has been a freer offering of steel scrap by dealers who have been forced to move purchased tonnage, and sales have been made around $16.50 delivered, where $17.25 had been strictly held. These transactions have been largely between dealers, however, as consumers generally are staying out of the market at present prices. The Pennsylvania has sold about 13,500 tons of old rails from its large accumulation, as its offerings for December were about 8,000 tons, compared with 21,500 tons in November. Most of this tonnage was sold from eastern divisions, and it is reported that an eastern mill has recently closed for about 20,000 tons of steel scrap. The rails are believed to have brought about $18 delivered. Rolling mill material is no easier. There is still some activity between dealers in turnings and borings by reason of recent short sales. The embargo on the plant of the Allegheny Steel Co. has not been lifted. We quote gross tons delivered in the Pittsburg district as follows:

Heavy melting scrap, $16 to $16.50; re-rolling rails, $17.25 to $17.75; bundled sheet scrap, $13.50 to $14; iron axles, $23 to $23.50; old iron rails, $18.50 to $19; No. 1 wrought scrap, $17.25 to $17.75; old car wheels, $16.25 to $16.75; low phosphorus, $18.50 to $19; machine shop turnings, $12.50 to $13; cast borings, $11.25 to $11.75; No. 1 cast scrap, $14 to $14.50; malleable, $14.25 to $14.75.

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Emma stack of the American Steel & Wire Co., at Cleveland, was blown in Dec. 1, and the Newburg stack of the company was blown out on the same date.

## CHICAGO.

### Burlington Orders Rails—Denver Viaduct Contract Awarded.

Office of THE IRON TRADE REVIEW, 1328 Monadnock Block, Dec. 15.

The most interesting transaction to come to light during the week was the contracting by the Chicago, Burlington & Quincy railroad for 40,000 tons of rails, the inquiry for which has been in the market several weeks. The rails are to be of 90-pound sections, open hearth steel and known as type A of the new American Railway Association specifications. The tonnage was divided, 30,000 tons to the Steel Corporation and 10,000 tons to the Colorado Fuel & Iron Co. That awarded to the leading concern will be rolled at Gary. It is also of interest to note that since the middle of November the contracting for spikes and bolts has resulted in the placing of more than 300,000 kegs. Other railroad buying included 19 steel coaches for the Illinois Central R. R., the order going to the Pullman Co. The Carolina, Clinchfield & Ohio has ordered 2,250 steel gondolas from the Pressed Steel Car Co.

The placing of the contract for the Denver viaduct in which there will be about 4,000 tons was the principal structural item of the week. Other contracts covered amounted to about 1,500 tons, while inquiries are reported in which there are figured about 6,000 tons. The rest of the market was quiet, but the general tone is exceedingly hopeful.

**Pig Iron.**—The pig iron market has remained inactive throughout the past week. One order for 2,000 tons was reported, the price being $13 Birmingham, but the general run of business has been for small lots from carloads to a few hundred tons. No changes in price have been noted. One sale for the first quarter was made at $13.25, but the usual schedules are $13 Birmingham for the first quarter, $13.25 for the first half and $13.50 for the second quarter alone. Local irons are offered for prompt shipment at a minimum price of $17 f. o. b. furnace with an advance of 50 cents a ton for first quarter. These prices can be shaded slightly at Milwaukee. We quote for first quarter delivered to Chicago plants as follows:

| | |
|---|---|
| Lake Superior charcoal ..... | $19.50 |
| Northern foundry No. 1..... | 18.00 to 18.50 |
| Northern foundry No. 2..... | 17.50 to 18.00 |
| Northern foundry No. 3..... | 17.00 to 17.50 |
| Southern foundry No. 1..... | 17.85 to 18.35 |
| Southern foundry No. 2..... | 17.35 to 17.85 |
| Southern foundry No. 3..... | 16.85 to 17.35 |
| Southern foundry No. 4..... | 16.35 to 16.85 |
| Southern No. 1 soft..... | 17.85 to 18.35 |
| Southern No. 2 soft..... | 17.35 to 17.85 |

| | |
|---|---|
| Southern gray forge | 15.60 to 16.10 |
| Southern mottled | 15.35 to 15.60 |
| Southern silveries, 4 per cent silicon | 18.10 to 18.60 |
| Southern silveries, 5 per cent silicon | 18.35 to 18.85 |
| Southern silveries, 6 per cent silicon | 18.85 to 19.35 |
| Jackson Co. silveries, 6 per cent. | 19.90 |
| Jackson Co. silveries, 8 per cent. | 20.40 to 20.90 |
| Jackson Co. silveries, 10 per cent. | 21.90 |
| Malleable Bessemer | 17.00 to 17.50 |
| Standard Bessemer | 17.65 to 18.15 |
| Alabama Basic | 17.35 to 17.85 |

**Billets.**—The billet demand has been less noticeable, but in the neighborhood of 1,000 tons of axle billets were placed during the week. Except for a few small orders for forging billets, there was little other business. Prices are firm and we quote 4 x 4-inch rolling billets $26.50, and forging billets $28.50, base Chicago.

**Merchant Steel.**—The interest in bar iron seems to have been revived in a measure and it is reported that for the first time during the year users show a willingness to contract for the next six months. Some contracting has been done over the period to April 1, but mills are not anxious to commit themselves on a basis which for extended future delivery appears to be altogether favorable to buyers. Specifications on bars generally are lighter, but with some few exceptions the mills have little of which to complain, especially with regard to steel bars. One interest reports an improved demand for machinery steel last week as compared with the remainder of the month. We quote as follows:

Bar iron, 1.50c to 1.53c; soft steel bars and bands, 1.58c, half extras; soft steel angles, less than 3 x 3, 1.68c; hoops, 1.98c base, full extras; planished or smooth-finished tire steel, 1.78c; iron finish, up to 1½ x ½-inch, 1.73c base tire card; iron finish 1½ x ½-inch and larger, 1.58c base steel card; channel for solid rubber tire, ¾ to 1 inch, 2.08c; and 1⅛ inch and larger, 1.98c; smooth-finished machinery steel, 1.83c; flat sleigh shoe, 1.63c; concave and convex sleigh shoe, 1.83c; cutter shoe, 2.95c; toe calk steel, 2.13c; railway spring, 1.93c base steel card; vehicle spring steel, 1.98c base vehicle card; crucible tool sheet, 7c to 9c, with higher prices asked on special grades. Quotations on shafting are 56 per cent off the list for carload lots, and 52 per cent off for less than carload lots, carload freight allowed to points in base territory. On iron and steel bars from local stocks, we quote as follows: Bar iron, 1.90c to 2c, full extras; soft steel bars, 1.80c per 100 pounds base, plus half extras; soft steel hoops, 2.30c, full extras.

**Plates.**—The entire volume of plate orders is made up of quantities too small to warrant individual mention and the aggregate tonnage is small. Both mills of the leading interest at South Chicago are running, but not on the strength of current orders. Prices, while firmer than they have been, are still subject to shading. We quote as follows:

Plates, ¼-inch and heavier, 6¼ to 100 inches wide, either universal or sheared, 1.78c Chicago. For extras see Pittsburg report. Jobbers' prices for shipment from local stocks are as follows: Tank steel, ¼-inch and heavier, up to 72 inches wide, 2c to 2.10c; from 72 to 96 inches wide, 2.10c to 2.20c; 3-16-inch up to and including 60 inches wide, 2.10c to 2.15c; 72 inches wide, 2.35c to 2.45c; No. 8, up to 60 inches wide, 2.10c to 3.15c. Flange and head quality, 25c extra.

**Sheets.**—Few interesting developments have transpired with regard to sheets since our last report. The trade has quieted down in the matter of both inquiry and specifications. The mills selling in this market are supplied fairly well with tonnage for the present and prices are firm. We quote Chicago prices from store as follows:

No. 10, 2.15c to 2.25c; No. 12, 2.20c to 2.30c; No. 14, 2.25c to 2.35c; No. 16, 2.35c to 2.45c; Nos. 18-20, 2.60c to 2.65c; Nos. 22-24, 2.65c to 2.70c; No. 26, 2.70c to 2.75c; No. 27, 2.75c to 2.80c; No. 28, 2.85c to 2.95c; No. 30, 3.25c. Galvanized sheets, No. 10 to 16, 3.05c to 3.10c; Nos. 18 to 20, 3.15c to 3.25c; Nos. 22 to 24, 3.30c to 3.35c; No. 26, 3.50c to 3.55c; No. 27, 3.70c to 3.75c; No. 28, 3.90c to 4.00c; No. 30, 4.40c to 4.50c.

**Structural Steel.**—Following a settlement of the difficulties which stood in the way of the letting of the Denver viaduct, the contract for 3,900 tons was placed with the Milwaukee Bridge Co. The general contract for the Main street viaduct at Kansas City, covering 700 tons of steel, was let to the A. M. Blodgett Co., of that city. The subcontract for the steel has not been placed. Specifications from several of the western roads including the Harriman lines, Santa Fe and Northern Pacific are being received in desirable tonnages. A number of inquiries emanating from this city have been sent out for bids and include 3,000 tons for the Crane-Best, now Oakmont plant, near Pittsburg, 650 tons for an elevator for Washburn-Crosby at Buffalo, 800 tons for the Wick building at Youngstown, 1,000 tons for an office building at South Bend, Ind., to be built by the Studebaker interests, and 1,000 tons for the Hermitage hotel at Nashville, Tenn. Contracts for quite a number of small jobs were closed, including one for 75 tons for a new shop for the Sheffield Bolt & Nut Works at Kansas City. We quote as follows:

Beams and channels, 3 to 15 inches, inclusive, 1.78c to 1.81c, delivered Chicago. For extras see Pittsburg report. Quotations from store are as follows for carload lots and over:

All angles, 3 inches and larger, including 6 inches, $1.95 per 100 pounds; angles over 6 inches, $2.05 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $1.95 per 100 pounds, base; channels, 3 inches and larger, $1.95 per 100 pounds, base. Less than carload lots are $1 a ton higher than foregoing prices.

**Rails and Track Supplies.**—The feature of the week was the placing of the contracts covering the rail requirements of the Chicago, Burlington & Quincy amounting to 40,000 tons. Of this 30,000 tons was placed with the leading interest to be rolled at Gary and 10,000 tons went to the Colorado Fuel & Iron Co. The rail sections are known as type A of the new American Railway Association specifications, open hearth steel, and weighing 90 pounds. No other standard section rail transactions are reported. The light rail business continues very good and some 3,000 tons have been ordered for the leading interest since Dec. 1. The contracting for spikes and bolts has been exceedingly heavy. Since the middle of November over 200,000 kegs of spikes have been ordered and more than 100,000 kegs of bolts. The demand for angle bars continues very light. We quote as follows:

Standard Bessemer rails, $28; open-hearth, $30, f. o. b. mill in 500-ton lots and over; less than 500 tons, $2 extra, full freight to destination; light rails, 25-pound to 45-pound, $26; 20-pound, $27; 16-pound, $28; 12-pound, $29. Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; spikes, 1.80c to 1.90c; track bolts, with square nuts, 2.15c to 2.25c; with hexagon nuts, 2.30c to 2.40c. Small railroad and square boat spikes, 1.90c base, f. o. b. Chicago.

**Merchant Pipe and Boiler Tubes.**—The merchant pipe trade is very quiet. There is some inquiry for tubes. A Minneapolis thresher company was in the market for some large size tubes and a Racine manufacturer of threshing machines has been specifying heavily. Most of the requirements of this trade have been covered by con-

tract, but little material has been taken out as yet. We quote as follows:

| | —Steel— Black. | Galv. |
|---|---|---|
| ¾ to 6 inches, inclusive..... | 73.2 | 63.2 |
| 7 to 12 inches, inclusive..... | 70.2 | 55.2 |

BOILER TUBES.

| | Steel. | Iron. | Seamless. |
|---|---|---|---|
| 2¼ to 5 in., inclusive.... | 63.2 | 50.2 | 50.2 |

**Cast Iron Pipe.**—Pipe manufacturers are awaiting the awarding of contracts at St. Paul and Indianapolis for an aggregate of 3,500 tons and for the placing of the 14,000 tons which is now being held up at Detroit. In the meantime, other inquiries are few. A number of cities including Chicago are expected to buy heavily in the next month or two. Prices are very firm and we quote as follows: 4-inch pipe, $27; 6 to 16-inch, $26; larger sizes, $25; gas pipe, $1 a ton higher.

**Wire Products.**—A slight decrease in the volume of orders for wire products is noticeable, but as compared with December of last year the orders during this month are three times as great in daily tonnage. A continued decrease in the volume of business is expected through January. Prices are firm, but rumors of advances are without foundation. We quote as follows:

Wire nails, jobbers' carload lots, $1.95; retailers' carload lots, $2; painted barb wire, jobbers' carload lots, $2.10; retailers' carload lots, $2.15, with 30c for galvanizing; plain wire to jobbers in carloads, 1.80c; and to retailers in carloads, 1.85c. Wire rods, Bessemer, $33; open-hearth, $34; chain rods, $33, f. o. b. Pittsburg.

**Old Material.**—The demand for scrap was light in the past week. The Pullman Co. bought several thousand tons of various grades to cover its usual requirements. Prices, however, are softer. The present market level is too high to permit of further accumulations by the dealers and they are forced to make some concessions in order to move their tonnage freely. We quote asking prices, which it is understood will be shaded for desirable sales. We quote as follows:

| | |
|---|---|
| Old car wheels | $15.75 to 16.25 |
| Old iron rails | 20.00 to 20.50 |
| Re-rolling rails ( 4 ft. and over) | 17.00 to 17.50 |
| Old steel rails (4 ft. and under) | 15.50 to 16.00 |
| Light section relayers, 45 lbs. and under, subject to inspection.... | 21.00 to 23.00 |
| Relaying rails, subject to inspection | 19.00 to 19.50 |
| Frogs, switches and guards..... | 15.25 to 15.75 |
| Heavy melting steel | 15.25 to 15.75 |

**We quote, net tons, as follows:**

| | |
|---|---|
| No. 1 R. R. wrought | $14.50 to 15.50 |
| No. 2 R. R. wrought | 13.50 to 14.00 |
| Knuckles, couplers and springs.. | 14.50 to 15.00 |
| Shafting | 16.50 to 17.00 |
| Iron car axles | 21.00 to 21.50 |
| Steel car axles | 18.50 to 19.00 |
| Dealers' forge No. 1 | 11.75 to 12.25 |
| Pipes and flues | 11.00 to 11.50 |
| No. 1 cast, 150 lbs. and less.... | 14.00 to 14.50 |
| No. 1 mill | 9.00 to 9.50 |
| Mixed busheling (Nos. 1 and 2). | 9.50 to 10.00 |
| Country sheet | 5.50 to 6.00 |
| No. 1 boiler cut | 10.50 to 11.00 |
| Boiler punchings | 12.50 to 13.00 |
| Cast borings | 7.75 to 8.25 |
| Mixed borings, etc | 8.00 to 8.50 |
| Machine shop turnings | 9.00 to 9.50 |
| Railroad malleable | 14.00 to 14.50 |
| Agricultural malleable | 12.00 to 12.50 |
| Stove plate and light cast scrap. | 12.25 to 12.75 |
| Old iron splice bars | 17.50 to 18.00 |

## CLEVELAND.

### One Interest Sells Good Tonnage of Pig Iron—Ore Shipments.

Office of THE IRON TRADE REVIEW, Browning Building, Dec. 15.

**Iron Ore.**—The compilation of the final official figures of ore shipments for the season has been delayed pending the expected shipment of one cargo from Escanaba to Milwaukee. The total movement for the season is about 25,425 000 tons. A few thousand tons have been sold during the past week to furnace interests which require small tonnages to fill out their requirements. There will be few transactions of this kind, as very little unsold ore has been shipped.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.50; Mesabi Bessemer, $4.25; old range non-Bessemer, $3.70; Mesabi non-Bessemer, $3.50.

**Pig Iron.**—Although most selling agencies report continued quiet in the market, one interest has sold 30,000 tons since Dec. 1, and states that inquiries for a very fair tonnage are still pending. An unusual sale was that of 300 tons of No. 1 southern foundry to a Cleveland foundry at somewhat above the usual quotations. The melt has shown a comfortable increase, and foundries are taking their iron promptly, in some cases asking for anticipation of shipments. The Pittsburg Steel Co. is figuring on a large tonnage of basic, but has not yet closed the contract, in addition to the one recently announced with M. A. Hanna & Co. We quote delivery in Cleveland over the remainder of the year as follows:

| | |
|---|---|
| Bessemer | $16.90 to 17.90 |
| No. 1 foundry | 17.50 to 17.75 |
| No. 2 foundry | 17.00 to 17.25 |
| No. 3 foundry | 16 50 to 17.00 |
| No. 2 southern | 17.85 to 17.35 |
| Gray forge | 15.00 to 16.00 |
| Lake Superior charcoal | 19.50 to 20.00 |
| Jackson Co. 8 per cent silvery.. | 20.05 |

**Coke.**—The foundries still continue to call for prompt delivery of coke, but are doing very little buying. Furnace coke is also dull, but all prices are firm. We quote standard furnace coke on contract, $2 to $2.10, and standard foundry coke on contract at from $2.35 to $2.50. Prompt furnace coke is sold at $1.80 to $1.85, and prompt foundry coke at $2.20 to $2.35.

**Finished Materials.**—The Empire Rolling Mill has resumed and it expects to continue in operation until Christmas, but the orders on hand do not make a large tonnage. Orders and specifications of the leading interest continue, and the prices of rerolling concerns are being met. There is considerable contracting for sheets and prices are more regular. Inquiries for a considerable tonnage of track fastenings are pending, but the railroads are not buying material of any kind in large quantities.

**Old Material.**—While the quantity of material actually being moved to consumers is not large, yet several price changes have taken place in the past week. These changes are not important, yet they show that the market, while exhibiting a tendency toward weakness, is still strong enough to maintain itself generally as yet. No. 1 railroad wrought declined 50 cents a ton, while machine shop turnings advanced the same amount. The Pittsburg embargo on borings has weakened the local market somewhat, but not enough to bring about a change in quotations. We quote, f. o. b. Cleveland, as follows:

| | |
|---|---|
| Old iron rails | $19.00 to 19.50 |
| Old steel rails (re-rolling) | 17.00 to 17.50 |
| Old steel rails (under 6 ft.) | 17.00 to 17.50 |
| Old car wheels | 15.50 to 16.00 |
| Old steel boiler plate | 13.50 to 14.00 |
| Steel axles | 20.00 to 20.50 |
| Malleable iron (railroad) | 15.00 to 15.50 |
| Malleable iron (agricultural) | 13.50 to 14.00 |
| Heavy steel | 15.75 to 16.25 |
| Country mixed steel | 13.50 to 14.00 |
| Low phosphorus | 17.00 to 17.50 |

**We quote, net tons, as follows:**

| | |
|---|---|
| No. 1 R. R. wrought | $15.50 to 16.00 |
| No. 1 busheling | 13.50 to 14.00 |
| No. 1 machine cast | 13.50 to 14.00 |
| Iron axles | 19.00 to 19.50 |
| Axle turnings | 11.00 to 11.50 |
| Machine shop turnings | 10.00 to 10.50 |
| Grate bars | 12.00 to 12.50 |
| Pipes and flues | 12.50 to 13.00 |
| Tank iron | 12.50 to 13.00 |
| Hoop and band iron | 9.25 to 9.75 |
| Sheet iron | 8.50 to 9.00 |
| Wrought drillings | 9.50 to 10.00 |
| Stove plate | 12.50 to 13.00 |
| Cast borings | 8.50 to 9.00 |

## CINCINNATI.

### Pig Iron Market Quiet, the Prices Continue Firm.

Office of THE IRON TRADE REVIEW, First National Bank Bldg., Dec. 15.

**Pig Iron.**—Prices in this territory remain firm at quotations, as furnaces have booked enough business to keep them in good position and they are apparently inclined to regard the outlook for the second quarter as

sufficiently strong to justify a firm holding attitude. In the south the minimum price basis is $13.00 for No. 2 foundry and this can be done for the entire first half, but for second quarter alone $13.50 is the usual asking price. In southern Ohio, $15.50 for No. 2 foundry at furnace is minimum and some operators are continuing their policy of holding for $16.00. These prices are applicable to the first half of the year as well as for prompt shipment. Consumers are apparently well covered for the first quarter and there is but little inquiry. A southern Ohio concern, which was in the market for 1,000 tons of low grade iron to take the place of scrap on analysis specifications of silicon, 1 to 1.50 and sulphur 0.075 or under, is reported to have bought about 600 tons at $15.60 delivered Hamilton, which is equivalent to $14.50 Ironton, or about the schedule for No. 4 foundry. A local melter is in the market for 700 tons of No. 3 foundry and there is an inquiry for 300 tons of low grade iron to take the place of scrap. Low grade irons appear to be scarce, as pipe makers have taken most of the offerings of low grades and in the south the furnaces have been working better the past year and have made less low grade iron. The high prices demanded for scrap seem to indicate that dealers have the market under control and melters for this reason are attempting to replace old material with low grade iron. The general situation as to buying is quiet, but the lack of inquiry is not at all disturbing to the sales agents or furnace interests, as it was expected that buying would be light after the liberal purchases made in November. Furnaces are shipping enough iron on their contracts to keep them from accumulating stocks and have enough confidence in the outlook to maintain prices on whatever they may be carrying on their yards. We quote for prompt shipment and delivery over the first quarter of 1909, delivered Cincinnati, based on freight rates of $3.25 from Birmingham and $1.10 from Ironton, as follows:

| | |
|---|---|
| Southern foundry No. 1 | $16.75 to 17.25 |
| Southern foundry No. 2 | 16.25 to 16.75 |
| Southern foundry No. 3 | 15.75 to 16.25 |
| Southern foundry No. 4 | 15.25 to 15.75 |
| Southern No. 1 soft | 16.75 to 17.25 |
| Southern No. 2 soft | 16.25 to 16 75 |
| Southern gray forge | 14.75 to 15.25 |
| Northern No. 1 foundry | 17.10 to 17.60 |
| Northern No. 2 foundry | 16.60 to 17.10 |
| Northern No. 3 foundry | 16.10 to 16.60 |
| Northern 8 per cent silicon | 19.60 |

**Finished Material.**—The market appears to present no features of interest and rules steady at unchanged prices. Jobbers fill small orders here at the following quotations:

Iron and steel bars, 1.85c to 2c, full extras. Angles, 3 x 3 and over, 2.10c to 2.25c; beams and channels, 15 inches and under, 2.10c to 2.25c; small angles and architectural channels, 2c base; plates, ¼-inch and heavier, 2c; 3/16-inch, 2.10c; No. 8, 2.15c; sheets, blue annealed, No. 10, 2.15c to 2.25c; No. 12, 2.20c to 2.30c; No. 14, 2.25c to 2.35c; No. 16, 2.35c to 2.45c; box annealed sheets, Nos. 18 and 20, 2.55c to 2.65c; Nos. 22 and 24, 2.65c to 2.75c; Nos. 25 and 26, 2.70c to 2.80c; No. 27, 2.75c to 2.85c, and No. 28, 2.85c to 2.95c; boiler tubes, 2¾ to 5 inches, 62 per cent off base; turn-buckles, 45 per cent off; rivets, 3c base; cold rolled shafting, 47 to 50 per cent off list; steel tire, 2.05c to 2.10c base.

**Coke.**—The furnace coke situation remains strong and ovens are shipping well up to their present capacity on contracts. There is but little spot furnace coke offering. Foundry coke is easy for prompt shipment, with prices ranging from 25 to 40 cents per ton less than on contracts. Consumers in a number of instances are following the spot market and are not contracting for next year. The oven interests are maintaining their asking prices on contracts with considerable uniformity. Quotations in the leading coke producing districts are as follows for next year's delivery on contracts:

| | PER TON. |
|---|---|
| Wise county furnace coke | $1.90 |
| Wise county foundry coke | 2.25 to 2.35 |
| Pocahontas furnace coke | 1.85 to 2.00 |
| Pocahontas foundry coke | 2.00 to 2.25 |
| Standard Connellsville furnace coke | 2.00 to 2.25 |
| Standard Connellsville foundry coke | 2.35 to 2.50 |

**Old Material.**—Dealers are maintaining prices and the market is quotably firm, but melters are resisting the placing of orders at the prices asked. Dealers' quotations to melters here are as follows:

| | |
|---|---|
| Old No. 1 R. R. wrought, net tons | $14.50 to 15.00 |
| No. 1 machinery, net tons | 13.50 to 14.00 |
| Old iron rails, gross tons | 18.00 to 18.50 |
| Old steel rails (re-rolling) gross tons | 16.50 to 17.00 |
| Old short lengths, gross tons | 16.50 to 17.00 |
| Old iron axles, net tons | 17.00 to 18.00 |
| Heavy melting scrap, gross tons | 14.50 to 15.50 |
| Stove plate, net tons | 11.00 to 11.50 |
| Wrought turnings | 8.00 to 8.50 |
| Cast borings, net tons | 6 00 to 7.00 |
| Car wheels, gross tons | 15.50 to 16.00 |

On Feb. 1, 1909, Hickman, Williams & Co. will take over the organization of N. S. Bartlett & Co. N. S. Bartlett will retire from business. J. O. Henshaw, of the New York office of N. S. Bartlett & Co., will go with Hickman, Williams & Co. This acquisition gives Hickman, Williams & Co. offices in New York, Philadelphia and Boston after Feb. 1, and the offices at Chicago, Louisville, Cincinnati, Pittsburg and St. Louis will be continued.

## PHILADELPHIA.

### Pennsy Rail Order Expected This Week—Excitement in Scrap Market.

Office of THE IRON TRADE REVIEW,
408 Central Trust Bldg., Dec. 15.

**Pig Iron.**—Compared to the November market, the current situation is quiet, but at that a very fair volume of business is daily finding its way to the books of the furnace companies. The basic market in particular has stiffened under the heavy dealing of the past week; some good lots were placed during the past week, among them two aggregating 15,000 tons, at a shade under $17, but it would be difficult to duplicate the purchase, as the saleable supply has been pretty well taken up. There has also been some brisk buying of gray forge iron during the week, pipe makers taking on some attractive tonnages. Stocks are very low and there is some call for anticipation on shipments. Furnaces in this district, on the other hand, are so well filled with orders that they are not soliciting business. We quote, first quarter delivery at eastern Pennsylvania plants, as follows:

| | |
|---|---|
| No. 1X foundry | $17.50 to 18.00 |
| No. 2X foundry | 17.00 to 17.50 |
| No. 2 plain | 16.50 to 17.00 |
| Standard gray forge | 16.00 to 16.50 |
| Basic | 16.75 to 17.25 |
| Low phosphorus | 21.00 to 21.50 |
| No. 2 Birmingham | 17.75 to 18.25 |
| No. 2X Virginia | 17.50 to 18.00 |
| No. 2 plain Virginia | 17.00 to 17.50 |

**Finished Materials.**—Some credence is given to another estimate on the Pennsylvania tonnage and its division as circulated early in the week: Corporation subsidiary, 62,500 tons; Cambria and Pennsylvania Steel companies, each 25,000 tons; Lackawanna Steel Co., 13,000 tons; Bethlehem Steel Co., 10,000 tons; total, 135,500 tons. At this writing no official statement in regard to the rail order is available, but it is considered certain that the award will be made before the end of the week, probably as indicated above. There is reason to expect other heavy purchases soon after the Pennsylvania closes. The government closes Tuesday on a collier requiring 2,000 to 3,000 tons of plates and the Isthmian Canal Commission will purchase an assortment of plates,, bars, etc., running into a large tonnage Dec. 21. We quote: Structurals, 1.75c to 1.90c; plates, 1.75c to 1.80c; refined bar iron, 1.50c to 1.55c; steel bars, 1.55c.

**Old Materials.**—An excited market prevails, following the discovery that in the closing days of November interests representing the Worth Bros. Co. bought up about 25,000 tons of heavy steel, at an average price, it is reported,

of over $17, delivered. Efforts of the large steel scrap consumers for several weeks past have been centered in holding down this line and preventing a sharp and heavy advance, but evidently these efforts have met with failure. A meeting of consumers was held in this city Friday, and the maximum price was set at $17, but there is practically no scrap to be had at this figure, as the heavy purchase noted served to clear up the accumulations outside of those in very strong hands. The high prices reached have driven steel mills to operation on pig iron wherever possible. We quote, eastern Pennsylvania delivery, as follows:

| | |
|---|---|
| Old steel rails (re-rolling) | $18.00 to 18.50 |
| No. 1 steel scrap | 17.25 to 17.75 |
| Old steel axles | 22.00 to 23.00 |
| Old iron axles | 25.00 to 26.00 |
| Old iron rails | 21.00 to 22.00 |
| Old car wheels | 16.00 to 16.50 |
| Choice scrap R. R. No. 1 wrought | 20.00 to 20.50 |
| No. 1 yard scrap | 17.50 to 18.00 |
| Machinery scrap | 16.00 to 16.50 |
| Low phosphorus scrap | 18.50 to 19.00 |
| Wrought iron pipe | 15.25 to 15.75 |
| No. 1 forge fire scrap | 15.00 to 15.50 |
| No. 2 forge fire scrap, ordinary | 10.00 to 10.50 |
| Wrought turnings | 13.25 to 14.25 |
| Axle turnings, heavy | 14.25 to 14.75 |
| Cast borings | 13.00 to 13.50 |
| Stove plates | 13.50 to 14.00 |

## NEW YORK.

### Heavy Sales of Iron Ore—Finished Materials Dull.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St., Dec. 15.

**Iron Ore.**—The heaviest selling movement in many months has been in progress during the past two weeks. Aside from the placing of Spanish and Newfoundland ores with eastern furnace plants to the extent of probably 600,000 tons, as noted in another column, there has been considerable activity in domestic ores. The sale of one block of 15,000 tons of eastern magnetic is reported at a price about 60 cents per ton in excess of that prevailing early in the fall and, in fact, up to the elections. The seller of this ore is refusing to make contracts for delivery more than two months in advance. Another eastern producer has placed one block of 15,000 tons at a considerable advance, and scattered selling by other interests is reported.

**Pig Iron.**—The approach of the holidays and the inventory-taking period is manifesting itself in the increasing absence of activity in the local market. Except for the spurt beginning last Tuesday or Wednesday, which resulted in some handsome bookings of foundry and basic for one or two interests, the situation has been featureless. Still, the placing of orders for comparatively small tonnages has been sufficient to maintain the extremely strong tone, and full prices are prevailing on all business going. The United States Steel Corporation has bought 5,000 tons of low phosphorus iron from the Northern Iron Co., for Pittsburg delivery during the first quarter. The stiffening of northern prices has brought some southern product into this territory, several thousand tons being booked during the week. Several merchant stacks selling into this territory will go into blast during the next six weeks to care for orders already on books. At present the make does not seem equal to the demand, particularly in basic. We quote, New York tidewater delivery, first quarter, as follows:

| | |
|---|---|
| Northern foundry No. 1 | $17.75 to 18.25 |
| No. 2X foundry | 17.25 to 17.75 |
| No. 2 plain | 16.50 to 17.00 |
| No. 2 southern foundry | 17.25 to 17.75 |
| Malleable | 18.00 to 18.50 |
| Basic | 16.50 to 17.00 |
| Gray forge | 16.25 to 16.75 |

**Ferro-Alloys.**—Aside from a limited inquiry for 50 per cent ferro-silicon, the market is quiet and featureless. Since the heavy buying reported a week ago, ferro-manganese has been quite inactive, though firm at $45.00 to $45.50, seaboard.

**Finished Materials.**—The steel trade apparently is marking time. No important structural contracts are announced and few new projects are developing. The near approach of inventory time is doubtless delaying some small orders, several small plate tonnages being placed during the week for delivery at the extreme end of the month. Talk of early advances seems to have been disposed of effectually, despite the high prices on steel scrap, and only routine business is expected to come before the meeting of plate makers in New York on Thursday.

Bids have gone in on a 1,600-ton building for Stearns & Co., Boston, and the Suffolk County court house at that place, after being let a couple of times on one set of bids, is being figured on again. The Pittsburg Steel Construction Co. has secured the Henry building at Seattle, 1,000 tons. Bids go in tomorrow on the Hermitage hotel at Nashville, and some new apartment houses in New York are coming along shortly. The last of the pier-sheds has not reached the bidding stage. The receivers of Milliken Bros. have taken a cold storage plant at Demarara, South America, 100 tons.

In cast iron pipe Lowell, Mass., is to close on 250 tons of 6 to 36-inch Dec. 21. The Amsterdam, N. Y., letting went to the United States Cast Iron Pipe & Foundry Co., 7,500 tons of large sizes, and the same interest took 500 tons for New Haven.

In keeping with the scrap advance, bar iron is decidedly stronger, though the demand still appears small. At least one important sale has been made during the past week. For prompt shipment the current figure is about 1.56c, New York, though higher prices are asked for advanced shipment. We quote: Angles, 2 to 6 inches x ¼-inch and heavier, 1.76c; beams, 3 to 15 inches, 1.76c; tees, 3 x ¼-inch and heavier, 1.81c; plates, carloads, tanks, 1.76c; marine boilers, 2.16c; bar iron, 1.56c to 1.61c; soft steel bars, 1.56c; sheets, No. 28, black, 2.66c.

**Old Material.**—The moderate railroad lists of the month have had little effect on the situation, which continues as for some time past with the exception of occasional advances. Trading is light. Notice has been given by the New York Central and West Shore railroads that after Dec. 24 for scrap shipments the minimum carload weight will be 20 gross tons, except where the car's marked capacity is less, when the minimum shall be 15 tons. Several changes in the freight tariff on scrap are announced. We quote, gross tons, New York delivery, as follows:

| | |
|---|---|
| Old steel rails (re-rolling) | $15.50 to 16.00 |
| Relaying rails | 20.50 to 21.50 |
| Old car wheels | 13.50 to 14.00 |
| Old iron car axles | 19.50 to 20.00 |
| Old steel car axles | 19.00 to 20.00 |
| Heavy melting steel | 15.00 to 15.50 |
| No. 1 railroad wrought | 17.00 to 17.50 |
| Iron track scrap | 13.50 to 14.00 |
| Wrought pipe | 12.50 to 13.00 |
| Cast borings | 10.00 to 10.50 |
| Wrought turningss | 11.00 to 11.50 |
| Heavy cast scrap | 13.00 to 13.50 |
| Railroad malleable | 13.00 to 13.50 |
| Stove plate | 11.00 to 11.50 |
| Grate bars | 11.00 to 11.50 |

## BUFFALO.

### Pig Iron Market Quiet—Inquiries for Advance Shipment.

Office of THE IRON TRADE REVIEW,
932 Ellicott Square, Dec. 15.

**Pig Iron.**—Little change marks the past week's market condition and, if anything, it is quieter. Quotations have not been altered. Most of the tonnage placed is of small lots, booked for 1909 delivery. Probably the principal feature of the present pig iron market is the indifferent attitude of the buyer as to time for delivery. Inquiries, when dates are mentioned, give long periods in which the prospective purchaser may desire his tonnage delivered, but the furnaces are very reluctant to quote on this class of business. As most of the inquiries are of this character, little actual business is being negotiated. We quote, f. o. b. Buffalo, as follows:

| | |
|---|---|
| No. 1X foundry | $16.50 to 17.00 |
| No. 2X foundry | 16.00 to 16.50 |
| No. 2 plain | 15.50 to 16.00 |
| No. 3X | 15.25 to 15.50 |
| Malleable Bessemer | 16.50 to 17.00 |
| Gray forge | 14.75 to 15.00 |
| Charcoal | 20.25 to 20.75 |

**Finished Products.**—At present the business of this district is reported unusually quiet; that is, compared with the general run of business this year, but it is, of course, much stronger considering everything than it was at this time last year. Actual business the past week was very slight. A small contract was awarded a Buffalo firm, Wurtz & Son, for the construction of the post office and administration building at Chautauqua, N. Y., which will be a part of the summer resort proposition established there by a private corporation.

## ST. LOUIS.

### Fair Tonnage of Southern Pig Iron Sold.

Dec. 15.

**Pig Iron.**—Orders aggregating about 1,900 tons of southern pig iron were placed in the St. Louis territory last week. The price is firm at $13 to $13.50 Birmingham for No. 2. Some furnaces are entirely out of the market, and quite a number of buyers seem to prefer to wait until after the first of the year to place their orders. Ohio foundry iron is firm at $15 to $16, furnaces.

Our prices, delivered, to which the freight of $3.75 Birmingham has been added, follow:

| | |
|---|---|
| No. 1 southern | $17.25 to 17.75 |
| No. 2 southern | 16.75 to 17.25 |
| No. 3 southern | 16.25 to 16.75 |
| No. 4 southern | 15.75 to 16.25 |

**Coke.**—The market for coke is strong, with 72-hour Connellsville foundry quoted at $2.25 to $2.75; 48-hour Connellsville furnace, $2 to $2.25, and Virginia and West Virginia, $2.50 ovens.

The freight from Connellsville and the Virginia fields is $2.80 to East St. Louis and St. Louis, and $2.70 from the Virginia fields, when shipment is destined beyond St. Louis.

**Old Material.**—Our quotations remain as follows:

| | |
|---|---|
| Cast iron borings, free from foreign material, net tons | $ 6.00 |
| Steel axle turnings, gross tons | 12.25 |
| Steel railroad axles, net ton | 17.50 to 18.50 |
| Iron railroad axles, net ton | 19.00 to 20.00 |
| Miscellaneous steel scrap, gross ton | 12.25 |
| Old car wheels, gross ton | 16.00 |
| No. 1 railroad cast scrap, net ton | 12.00 to 12.50 |
| Heavy machinery cast, net ton | 13.00 |
| Stove plate and light cast, net ton | 11.50 |
| Sheet iron, net tons, uncut | 5.00 |
| No. 1 railroad wrought, net ton | 12.00 to 13.00 |
| Railroad malleable, net ton | 11.50 |
| Heavy melting steel, net ton | 11.50 to 12.00 |
| Relaying rails, net ton | 14.00 to 15.00 |

## SEATTLE.

### Movement from the East—Slow Improvement in Pig Iron.

Office of THE IRON TRADE REVIEW,
302 Pioneer Bldg., Seattle, Wash., Dec. 12.

A heavy movement of such iron and steel products as must come from the east is the leading feature of the Pacific coast iron trade at present. While under ordinary circumstances in anticipation of the holiday and inventory season the demand would be falling off at this time, on account of the advance in freight rates which takes effect Jan. 1, the trade is being artificially stimulated. As a result it is expected that January will be quiet in such lines as are imported from the east, but that February and March will witness a normal demand. Logging and lumber interests are buying wire products more freely, but a temporary slacking off in building construction is curtailing the demand for concrete reinforcing material. The machine tool trade is better than for some time past. The foundry business is about stationary.

**Pig Iron.**—The market is continuing its slow improvement and has now reached a condition where advanced prices are being asked and maintained. The movement from San Francisco continues in small lots of 100 and 200 tons. Spot iron is very scarce on the north coast at present, the only available supply being a few hundred tons at Tacoma and some iron held by the various foundries. Much activity in pig iron is not expected until after the first of the year. We have advanced our prices and quote as follows:

| | |
|---|---|
| English soft, No. 1, spot | $26.50 to 27.00 |
| English soft, No. 1, to arrive April-May | 24.00 to 24.50 |
| Glengarnock No. 1, spot | 28.00 to 29.00 |
| Southern soft, No. 2 | 26.70 to 27.20 |

**Old Material.**—Dealers are harboring their stocks in anticipation of an advance and the movement of scrap for foundry use is light. Prices are very firm. Wrought iron is still a drug on the market and there has been very little sold during the past six weeks. We quote in net tons f. o. b. Seattle:

| | |
|---|---|
| Foundry and machinery scrap | $17.00 to 19.00 |
| Old steel rails | 8.00 to 9.50 |
| Railroad wrought | 10.00 to 11.00 |
| Country wrought and busheling | 5.00 to 7.00 |

**Merchant Iron.**—The demand for rolled products, which has been one of the features of the market for the past six weeks, is tapering off as the holiday and stock taking season approaches. The Seattle Steel Co. is operating its mill on a reduced schedule while the mill of the Pacific Hardware & Steel Co. at Portland is closed for repairs. Owing to the freight advance Jan. 1 the movement of eastern bar iron and steel is heavier than that of the locally rolled product. Prices are steady. We quote base prices per 100 pounds, f. o. b. Seattle: Common iron bars, $2.25; soft steel bars, $2.35; machinery steel, $2.75; Norway iron, $3.50; angles, channels, zees and tees, under 3-inch, $2.75.

## BIRMINGHAM, ALA.

### One Company Makes Record in Shipment of Pig Iron.

Dec. 14.

While the pig iron production in Alabama continues to take on a little improvement, the demand is steady and the shipments are of good size. There will hardly be any further furnaces blown in until after the holiday season. It is not believed in this district that the labor at work now will hesitate much during the holiday period, not having had steady employment for some time. The furnace masters believe that it will be more advisable to wait until next year before attempting to put iron makers in operation. Something like five furnaces will be ready for the torch early in next year and the old-time output can be secured with ease. The Sloss-Sheffield Steel & Iron Co. announces that the idle furnace at North Birmingham will be put in shape for operation, several new stoves to be added to the force and other improvements made, something like $200,000 to be expended on the work.

Quotations in this district hold firm at $13 per ton, No. 2 foundry, with some sales being made at that price for delivery during the second quarter of the coming year. Some of the furnace companies are quoting $13.50 per ton, No. 2 foundry, and it is stated a few sales have been made, though not many. The sales for delivery during the second quarter of the coming year will aggregate nicely already. The shipments of iron from this district are interesting. According to President J. C. Maben, of the Sloss-Sheffield Steel & Iron Co., that company shipped out more iron in November than during any one month in the history of the company.

The purchase of the properties of the Tecumseh Iron Co., consisting of 10,000 acres of brown ore lands in the eastern part of the state, by the Birmingham Coal & Iron Co., means much to the latter company, which will continue the operations on the

property and also increase the development.

The cast iron pipe concerns in the Birmingham district are being kept very busy these days. It is understood that orders in hand or in sight will warrant a steady operation for many months to come. Better prices are obtaining for cast iron pipe nowadays. The Central Iron Co. has started work on plans for a pipe plant at Holt, Tuskaloosa county. The old Weller rolling mills at Gadsden will resume operations this week. The United States Cast Iron Pipe & Foundry Co. is making shipments on the order for 15,000 tons of cast iron pipe to Cuba, the pipe being produced at the Bessemer and Anniston plants.

## BRITISH IRON MARKET.

### Hopes That the Worst of the Depression Has Passed.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Dec. 5.

The British iron trade is at present in nothing like an active state, with buying decidedly slow. But the signs are somewhat more hopeful, and the general view would appear to be that the worst of the depression is now past. There are many who look eagerly to the New Year, anticipating that it will be accompanied by a better state of things. Yesterday's quotation for Cleveland No. 3 cash was 49s ($12), with 48s 11½d ($11.99) cash offer for warrants. No. 1 pig realized 51s 3d ($12.54). The supply of lower qualities of iron is not so large on the Middlesbrough market as it was and this removes a very depressing factor from the situation. November stocks of Cleveland at Connal's showed a larger increase than in any month since 1905. Only on one day during the whole month was there any decrease. The total amount in stock at the end of the month was 106,024 tons, an increase of 17,523 tons on the month. The hematite market is a little stronger. On the market these general conditions are fairly well reflected. Business is quiet, and there is an optimistic section looking forward to the New Year to bring an increase of business. A peculiar feature is that all orders during the past week or two have been for New Year's deliveries. The Midland iron and steel wages' board return, which was issued early this week, has caused some little surprise. In view of the state of trade it was anticipated that a reduction of 5 per cent would have taken place in the wages of puddlers, millmen and forgemen, instead of which the reduction was to the extent of only 2½ per cent. The bi-monthly return states that the average selling figure during the two months, as based on the sales of the 17 selected firms, was £6 6s 11.12d. The figure for the previous two months was $6 9s 8.75d, so that the latest return shows a reduction in the selling figure of something like half a crown.

# METAL MARKET

## NEW YORK.

Dec. 15.

**Copper.**—The market is somewhat "spotty." Accumulations in weak hands have been well cleared up and prices are holding fairly firm on a very limited volume of buying, particularly in Lake. **We quote: Lake,** 14¼c to 14½c; electrolytic, 14c to 14¼c; casting, 13⅞c to 14⅛c.

**Pig Tin.**—Meager buying for domestic account with a heavy decline abroad has sent the market down to about 28¾c to 29c, the latter figure holding on quite advanced delivery.

**Pig Lead.**—The price remains stationary, despite strong selling pressure from the west, and we quote 4.22½c to 4.27½c.

**Spelter.**—The scarcity of ore in the Joplin district and its advance has been followed by a sharp jump in spelter quotations, which are now ruling firm at 5.10c to 5.15c, New York.

**Antimony.**—We quote: Cookson's, 8⅛c to 8¼c; Halletts', 8c to 8⅛c; ordinary brands, 7⅝c to 7⅞c.

## ST. LOUIS.

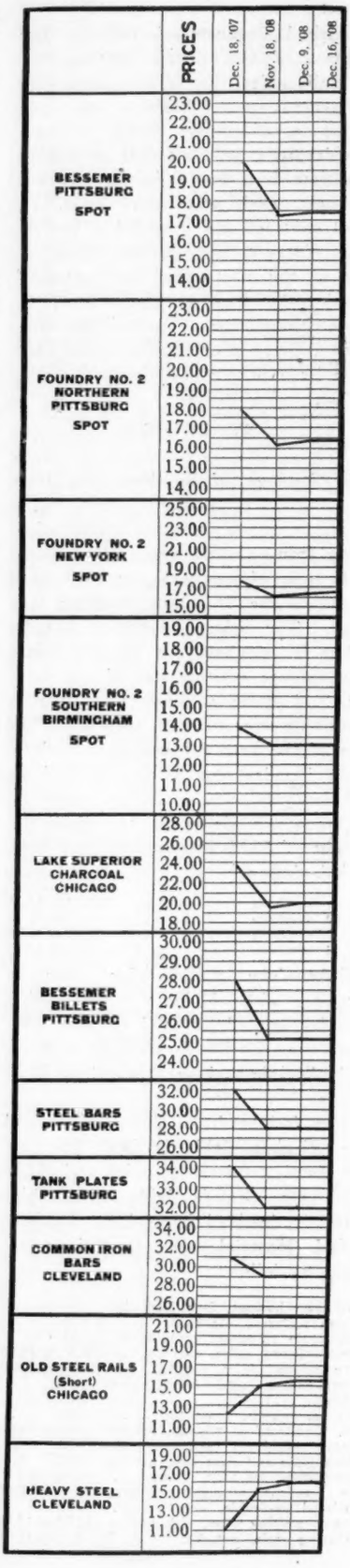
Dec. 15.

**Lead and Zinc.**—The prevailing price of zinc in the Missouri-Kansas district dropped from $44 to $43 for 60 per cent zinc ore, during the latter part of last week. There was little demand. Because of the light purchases last week, it is not believed that a further drop will take place this week. The highest price paid for 60 per cent zinc this year was for one bin of ore from the Midway camp, which brought $45. Operators are manifesting a disposition to hold their ore for stronger prices.

Lead was weak at $50, with little demand. Spelter remained steady at $5.15 to $5, and pig lead from $4.17½ to $4.15.

The Johnson Co., of Lorain, a creditor of the Brown-Cochrane Co., of that city, has an option on the assets of that company until Dec. 22.

## PRICE CHART.



## DEATH OF MAJOR GEORGE M. LAUGHLIN.

Major George McCully Laughlin, soldier and philanthropist, and a prominent member of the second generation of Pittsburg's great steelmakers, died at his residence in that city, Dec. 11, from pneumonia. Though for several years he had not been actively engaged in the conduct of the affairs of the company, Major Laughlin had spent practically his entire business career in important capacities with the Jones & Laughlin Steel Co.

Major Laughlin was 66 years of age, having been born in Pittsburg, Oct. 21, 1842, of Scotch-Irish ancestry. After receiving his preliminary education in private schools at Pittsburg, he entered Washington and Jefferson college, Washington, Pa., as a member of the class of 1863. His collegiate work was interrupted by his response to the call of duty in the War of the Rebellion, and he entered that great conflict as second lieutenant of company E, 155th Volunteer Infantry, in 1862. His service extended from Antietam to Appomattox and was marked by signal bravery and military achievement, which rapidly gained promotions for him. He was one of the few officers to witness the meeting of Grant and Lee at Appomattox.

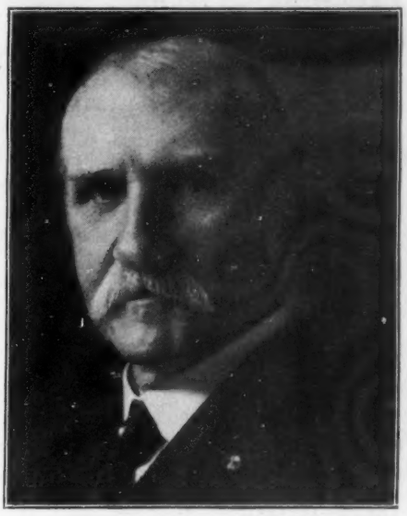
Upon the restoration of peace, Major Laughlin entered the old firm of Jones & Laughlin, even then one of the great factors in the world of iron and steel, and maintained his connection with that manufacturing interest to the day of his death. His active participation in its affairs continued for 35 years, and in 1900 he retired as vice chairman of the board of directors. At the time of his death he was serving as a director of the company. For nearly two decades he was secretary and treasurer of the old firm of Jones & Laughlin, Ltd., retaining that post until the reorganization as the Jones & Laughlin Steel Co.

Major Laughlin's charities were of the unostentatious sort, but liberal. He was particularly generous in lending substantial aid to his alma mater, Washington and Jefferson college.

His home life was saddened by the death of his wife seven years ago. The three children who survive the father are: George M. Laughlin Jr., superintendent of the Soho department of the Jones & Laughlin Steel Co.; Thos. K. Laughlin, assistant treasurer of the Jones & Laughlin Steel Co.; and Irwin B. Laughlin, charge d'affaires at the American embassy in Athens, Greece. He also leaves two brothers, Henry A. Laughlin and James Laughlin Jr., directors of the Jones & Laughlin Steel Co., and one sister.

In addition to his steel-making prominence, Major Laughlin was conspicuous in Pittsburg's financial circles and with art and business organizations.

The funeral services were held at his late residence Dec. 14. The honorary pallbearers were: B. F. Jones Jr., William Larimer Jones, Willis L. King, James I. Buchanan, Henry Graham Brown, John Z. Speer, William Witherow, W. H. Nimick, Judge W. G. Hawkins, H. S. A. Stewart, A. S. Beymer, Dr. T. M. T. McKennan, John D. McKennan and W. C. Moreland.



GEORGE M. LAUGHLIN.

## OBITUARIES.

Joseph Schill, for many years president of the Schill Bros. Co., Crestline, O., died Dec. 13 from injuries received the day before.

Charles R. Herron, for many years manager of the Ross-Meehan Foundry Co., at Chattanooga, Tenn., died there Dec. 8. At the time of his death Mr. Herron was manager of the Chattanooga plant of the American Brake Shoe & Foundry Co. He was widely known throughout general business and manufacturing circles of the south.

Kenton Chickering, vice president of the Oil Well Supply Co., died at his home in Oil City, Pa., Dec. 9, from paralysis. He was born in Worcester, Mass., May 16, 1847, and had resided in Oil City since 1873. When the Oil Well Supply Co. was organized in 1878 he was made secretary, and when it was incorporated in 1901 he was elected vice president. Mr. Chickering was prominent in fraternal circles.

John P. Davies, organizer, president and general manager for many years of the Racine Malleable & Wrought Iron Co., Racine, Wis., died Dec. 11, following an illness with inflammatory rheumatism. He was born in Racine in January, 1853, received his early education in that city, and when 19 years old organized the Racine Malleable & Wrought Iron Co., which developed into an important industry. The original plant was destroyed by fire in 1898. A new plant was erected, which was taken over by a Cleveland company, and Mr. Davies remained with that company.

William J. Copp, a pioneer of the foundry business in Canada, died Dec. 6 at Hamilton, Ont., aged 80 years. Born in England, he came to Canada as a youth, and in partnership with his brother started a foundry in Woodstock, Ont., in 1857. They removed to Hamilton 10 years later as the firm of Copp Bros., and conducted a successful foundry business for over 30 years, but which was discontinued in 1900. Subsequently, in partnership with his son Harold, Mr. Copp began the manufacture of stoves at Fort William, which business is still carried on under the name of W. J. Copp, Son & Co.

Edward F. C. Young, president of the Dixon Crucible Co., died at Jersey City, N. J., on Dec. 6. Mr. Young was one of New Jersey's most prominent citizens and had lived in Jersey City from the time he was nine years old. He was born in Morris county, N. J., and was 73 years old when he died. He became connected with the Dixon Crucible Co. in straightening out its affairs 30 years ago, when they were in an involved condition, and when that was accomplished he was chosen president. Mr. Young had been in ill health during the past year, though attending to his business affairs most of the time.

## RAIL SALES.

(Special Telegram.)

New York, Dec. 16.—The United States Steel Corporation has sold 30,000 tons of open-hearth rails to the Burlington, 6,500 to the Soo line and 3,000 to the St. Louis Terminal. The Lackawanna Steel Co. has sold 1,100 tons to the Panama canal.

A 1,200-ton pier at San Francisco has been awarded to Dyer Bros. Structural bookings of the month will be close to 50,000 tons.

# THE IRON TRADE REVIEW

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## PRODUCTS AND BY-PRODUCTS.

Material realization of the statement of an engineer many years ago, that "a blast furnace is simply a huge gas producer," is to occur within the next few weeks, as the announcement has recently been made that the first two blast furnaces at the Gary, Ind., plant will be started Jan. 1 or earlier for the purpose of furnishing gas, although no portion of the steel plant proper will be ready for operation before April 1. Power is required for certain operations and as power from the furnace gas will be used when the plant is in regular operation, the facilities provided will be used at once.

The use of blast furnace gas as a source of power in the United States is not new. Furnace gas has been used for years successfully at Buffalo and at some other points, but in such cases the gas has stood in the light of a by-product, the result of operations which would have been conducted just the same had no gas resulted. In the Gary instance, on the other hand, the blast furnaces are to be run primarily as gas producers. Pig iron will be made just the same, but it is the gas, rather than the pig iron, which is the desideratum. The resulting pig iron could be produced elsewhere, as it cannot be used at Gary until the steel plant is in operation.

As a gas producer, the blast furnace produces gas involving about one-half the total heat value of the coke, and this rule holds fairly well, whether the ores be rich or lean. As the leaner ores require more coke for smelting, the furnace working on lean ores produces more gas than the furnace working on rich ores. The blast furnaces at Gary are rated at 450 tons a day each, so that if they use a ton of coke per ton of pig iron, the tunnel head gases from the pair will contain the full heating value each day of about 450 tons of coke, which would be in excess of 120,000 horsepower. About one-third of the heat, however, must be used to heat the blast, leaving 80,000 horsepower. With the power plants hitherto in general use at blast furnaces, practically all this gas would be needed to generate steam to run the blowing engines. With the most economical boiler and engine plant, some could be saved.

The gas engine, however, will develop from two to three times as much power from gas as does the boiler and steam engine plant, and may perhaps do still better than this. At only 15 per cent efficiency for the gas engine, from the 80,000 horsepower in the gas left after heating the blast, in the pair of Gary furnaces, there would be developed 12,000 horsepower, of which no more than 5,000 should be required for blowing, leaving 7,000 horsepower at the very least for other purposes. This is a minimum estimate, and the actual surplus power developed may easily be found to exceed 10,000 horsepower, depending on the efficiency of the power plant and the working of the furnaces.

This is an enormous amount of power to be developed from a pair of blast furnaces, as a clear gain over older practice in which all the power produced is either used in operating the blast furnace itself or is lost.

The power, of course, is not clear gain. There are interest and other charges on the investment, and care must be exercised in drawing general conclusions, just as is the case with water powers, when it may occur that the cost of production and utilization equals the cost of production of the power by other means. The blast furnace has a most important advantage over water power, however, in that pig iron is usually produced at a point where power is needed. This is particularly the case with blast furnaces connected with steel works, and as a rough and ready rule it has been stated that under average conditions the surplus power from the blast furnace is sufficient to operate the attendant steel works and rolling mill, if the steel is not to be brought to a more finished shape than the rail, plate or structural shape.

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**Steel Ore Cars.**—The Summers Steel Car Co., Pittsburg, has been awarded the contract for furnishing 800 all steel ore cars of a new type for the Duluth & Iron Range railroad, a subsidiary of the United States Steel Corporation. The cars are to be of the center dump steel hopper type, designed especially for ore transportation, and are in some respects similar to the cars now in use on the Union railroad of the Carnegie Steel Co., which were supplied by the Summers company. They will have a carrying capacity of 50 tons. The construction work upon the cars will be done by the Standard Steel Co., Pittsburg, upon designs supplied by the Summers Steel Car Co. The contract calls for delivery in March and April.

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**Oil Used for Fuel.**—The second of two large hydraulic dredges required by the United States government for service in the Gulf of Mexico has just been placed in commission. A notable feature of these two dredges is the fuel, oil being used exclusively. The entire equipment was furnished by Tate, Jones & Co., Inc., Pittsburg, makers of Kirkwood burners. The Galveston, the newly commissioned dredge, is of 2,000 indicated horsepower capacity, four boilers being required. It was equipped after a thorough test of the Tate, Jones & Co., Inc., burners on the Comstock, built six years ago, also equipped by the same company.

## FOREIGN IRON ORE

**Bought by Eastern Interests—Provision Concerning the Tariff.**

Heavy buying of foreign iron ore for 1909 delivery has been done by eastern furnaces during the past few days. The bulk of contracting has been in Spanish ore, but a large tonnage of Nova Scotia product has also been taken, the purchasers being furnaces commanding an average freight rate of 50 to 60 cents from seaboard, a rate possible to the Schuylkill and Lehigh valleys. As nearly as can be estimated, about 600,000 tons of foreign ores were taken during the first half of December. It is known positively that one importer disposed of 200,000 tons of a very superior grade of Spanish ore, and that 200,000 tons of Wabana ore was sold by the Nova Scotia Steel & Coal Co., on all of which the price delivered at Atlantic seaboard, duty paid, was 7 cents per unit. At a slightly lower cost, heavy tonnages of other Spanish ores were also contracted for, so that the estimate of 600,000 tons for total sales is a conservative one. The higher grade of Spanish ore is in high favor with eastern furnacemen, who state that it compares very favorably with Mesabi non-Bessemer. It runs about 0.05 per cent in phosphorus and is entirely free from zinc, copper and arsenic. Delivered at the furnaces, its cost averages 8 cents per unit, as against 9.6 cents per unit for Mesabi non-Bessemer, the freight rate from lower lake ports running close to $1.50 per ton. These contracts just closed all contain the provision that the consumer is to have the entire benefit of any reduction that may be made in the iron ore duty, at present 40 cents per ton.

It is understood that an operator in the Cuban district is offering to contract for 1909 delivery. It can be stated that this offering is not of ore produced by the two large independent steel companies interested in that field.

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**A Large Addition.**—The New Process Raw Hide Co., Syracuse, N. Y., manufacturers of New Process pinions and cut gears of all kinds, is constructing a large addition to its present plant. The company has been operating its plant nights for two months and business is coming in faster than it can be gotten out advantageously in the present plant. The new addition, for which contracts have already been let, will consist of two stories and a basement, 60 x 80 feet, extending east on Plum street from the present plant. The construction is to be of steel and brick with cement floors and will increase the available floor space by over 13,000 square feet. The cost of the new building, complete, will be from $25,000 to $30,000. The company has machinery on order for delivery during the next two months approximating $12,000, consisting principally of automatic turret lathes, bevel gear planers and grinding machines. An additional hardening furnace for treating automobile transmission gears and drive gears will also be installed. Work on the new addition will be pushed as rapidly as possible and is expected to be completed early in February. The company reports the total of the orders at present on its books to be in excess of any time in its history.

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**Will Extend Ore Docks.**—The recent incorporation of the South Buffalo Canal & Dock Co., with a capital of $500,000, means that the Buffalo & Susquehanna Iron Co., Buffalo, N. Y., is planning to extend its ore docks. The stockholders and directors of the South Buffalo Co. are identical with those of the Buffalo & Susquehanna Iron Co., the officers being: President, William A. Rogers; first vice president, Stephen M. Clement; second vice president, Charles W. Goodyear; general manager, Hugh Kennedy. The new company has purchased 30 acres of land, with 950 feet of dock, and half ownership of the ship canal along its front. Room will thus be afforded for storage of iron ore mined by the company in excess of its own requirements, and eventually for additional blast furnace capacity, which will no doubt be added as soon as the market has expanded sufficiently to absorb the additional product.

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**Charcoal Stack Sold.**—The property of the Eagle Iron Co., Chattanooga, Tenn., has been sold by L. S. Colyar, of Chattanooga, and others, to T. S. Kyle, of Gadsden, Ala., as agent. The property includes the Attalla charcoal furnace plant at Attalla, Ala., a battery of charcoal ovens and a considerable acreage of iron ore lands. The plant has been practically idle during the past three years.

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**Assistant Secretary.**—The Council of the Iron and Steel Institute has offered the assistant secretaryship to L. P. Sidney, who was appointed as Mr. Brough's assistant in succession to Mr. Lloyd in 1904. Hitherto there has been no formal office of this description. As announced last week, the new secretary is G. C. Lloyd.

## IRON ORE DEPOSITS

**Will be Developed, if Canadian Government Makes Concessions.**

Toronto, Can., Dec. 12.—George E. Drummond, T. J. Drummond and W. F. Parsons, of the recently-organized Canada Iron Corporation, were this week in New Brunswick, interviewing the provincial government with the view of obtaining important concessions, in order to open the iron ore deposits of Gloucester. They claim that these deposits are the richest in Canada, having already 50,000,000 tons of ore in sight. They ask for a bond guarantee for the construction of a railroad from the mines to Bathurst and the right of cutting timber for use in mining from the crown lands. The government was favorably disposed with regard to these requests provided some restrictions for safeguarding the public interest were adopted. The company will undertake, on the completion of the railway, to ship 2,000 tons of ore per day, and proposes to expend some $200,000 in the construction of docks, etc. The formal transfer of the various iron plants and other properties embraced in the merger was made on Dec. 2. These include the Canada Car Wheel Works, Montreal, Canadian Iron & Foundry Co., Hamilton, and plants at Three Rivers, Que., St. Thomas and Fort William, Ont., and Londonderry, N. S.

The Canadian Northern Railway has awarded a contract for the construction of 400 freight cars to the Crossen Car Works, Cobourg, Ont.

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At a recent meeting of the directors of the Sloss-Sheffield Steel & Iron Co., James H. Dooley, Richmond, Va., was chosen a member of the executive committee in place of Joseph Bryan, deceased. Major Dooley is one of the largest stockholders and a director of the Sloss-Sheffield company. Harry Bronner, of Hallgarten & Co., New York bankers, was elected a director in place of Mr. Bryan.

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One of the Watts stacks at Middlesboro, Tenn., of the Virginia Iron, Coal & Coke Co., was blown in Dec. 2, after being put in first-class condition. It has not been definitely decided just when the second stack will be blown in.

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The blowing in of the new furnace of the Ironton Iron Co., Ironton, O., Nov. 21, was witnessed by a large assemblage. The fire was started by Miss Mary Peters, daughter of Supt. Charles Peters.

## SCHWAB TESTIFIES.

(Continued from first page.)

ton was enough to produce a ton of iron. The limestone charge was 35 cents, and $1.65 a ton would cover labor, supplies, etc., a total of $8.25 a ton of iron. Many billet conversion contracts were made that year at $5 a ton, a figure which included profits. The mill cost to make rails was about $3.75 a ton. There never was another year when steel making costs were so low. We paid labor $1 a day and rail rates were about a third of present rates. Great Britain had the same conditions, but lacked modern mechanical appliances then.

### Value of Ore.

"Eight or nine years ago, I stated that I valued the Corporation ores at $1 a ton in the ground. This optimistic statement has been verified by the leasing of lower grades at that figure. Deeper operations now render mining more costly, probably 50 or 60 cents on the Mesabi. Freight rates to Pittsburg make the cost delivered $4.05 per ton of lower content. The ore cost is, say, $8.75 per ton of iron. Coking coal then sold at $600 an acre; now it is $3,000, and the cost of coke is $1.50 a ton of iron, plus 85 cents freight. Besides, more is needed to smelt the poorer ores and the total coke cost is about $2.95. Put down limestone at 75 cents and the labor item at $1.25 and you have $13.70, the present cost. As a matter of fact, during the past year many Pittsburg works closed down because they could not produce pig iron at $14 a ton.

### Allowance for Losses.

"In conversion, 10 per cent must be allowed for losses, or a $1.40 charge on $14 pig. The labor cost is 85 cents in the converter, 45 to 50 cents in the blooming mill and $1 to $1.25 in the rail mill. As it takes 100 tons of billets to make 80 tons of rails, a heavy expense must be marked off here and all other costs, refractories, manganese, etc., show heavy increases. Skilled labor is employed and has gone up more than anything else. Figuring no profits or depreciation, it now costs $21.50 to produce Bessemer rails and $2 higher for open-hearth. The average cost has gone up every year since 1900, and this year is the highest in 10, owing to the limited production. Every year since 1900 the average earnings of the Corporation and Bethlehem employes have increased."

Explaining the $28 rail price maintained for several years, Mr. Schwab said: "I'll be perfectly frank with you. We had the steel war late in the nineties and it was ruinous. The manufacturers then got together and restored the old prices. None of us now would alter that price, for fear of repeating that experience."

The actual value of the Corporation properties at its organization he thought equal to its capitalization, and told the familiar history of the conversion of the Carnegie Steel stock.

Further on, speaking of costs, Mr. Schwab said the higher freights and raw materials explain the greater cost of pig iron making in this country, excepting Birmingham, than in England. It costs $1 a ton more to make rails than billets, and $4 or $5 more to make structural steel.

### Must Have Protection.

As to the tariff, he said: "To keep up freights, costs of supplies, conserve our raw materials and maintain wages, we must have protection. Give us conditions as they exist abroad and we can go alone. But this would involve labor reductions all along the line, direct and indirect, and would mean a radical change in American manufacture."

"Keep out of the manufacture of steel unless you can show 20 to 25 per cent profit," said Mr. Schwab. "Frequent changes in processes mean frequent rebuildings. As superintendent at the Braddock works, I rebuilt the converting department three times in five years. Steel plants grow more costly each year. Our mill at Bethlehem, the most modern outside of Gary, represents an expenditure of $21,000,000; it makes 500 tons of rails and 10,000 tons of structurals daily. It should show $8 a ton rail profit, and the average blast furnace should make $2 a ton or over. Average American manufacturing should show net profits of 10 to 15 per cent. Further in regard to changes, I predict that in five years not a single Bessemer works for converting steel will remain in this country. The change to the open-hearth is under way at very great cost to meet the demand for quality. The Bethlehem mill has inaugurated another radical change in structurals and it is possible that before another 10 years the electric steel making process developed in Germany may displace the open-hearth."

### Selling Abroad.

"Is it a habitual practice to sell more cheaply abroad?" asked Champ Clark.

"Yes, and a very wise one," said Mr. Schwab, referring also to the resulting stability of domestic prices. "Consumers welcome this in preference to violent fluctuations. Personally, I don't think prices are high enough now, considering manufacturing costs."

"Then there's no hope of getting a lower price?" asked Clark.

"No, I'm afraid not."

### Cast Iron Pipe.

Walter Wood, representing R. D. Wood & Co., Philadelphia, discussed the tariff on cast iron pipe. His testimony was well received.

"We would be fairly protected with a duty $3.00 a ton in excess of that on pig iron," he said. "The present duty on pipe is larger than the market really demands and to that extent is detrimental to the growth of business. The cost of making a ton of pipe is about $10.00 divided into $5.50, labor cost, $2.50, material cost other than for iron, $1.25 for overhead charges and $1.00 for selling expenses. The labor cost is a large factor and should be protected. But any duty that is more than enough is too high. We are losing money at $24.00 a ton because the high tariff has built up domestic competition until it has become exasperating. A $3.00 differential would be enough if the pig iron duty were wiped out. But we might lose some Pacific coast trade, particularly that handled from Birmingham."

The higher relative price of American irons Mr. Wood ascribed as due to higher ores. Asked why ores cost more here than in England, he said: "Because the price is paid," adding a little later, "ask the fellows who sell the ores."

### Duty on Ferro.

Robert Gilchrist, representing the Western Foundry Supply Co., New York, asked that the ferro-manganese duty of $4.00 a ton be continued, stating that his company was ready to spend half a million on a furnace to produce 80 per cent ferro in this country. He showed the almost infinitesimal part of the pound price of finished steel due to the present tariff on ferro. He urged its continuance to foster a new industry, saying that the probable American manufacturing cost is $40.00 a ton against $38.50 in Great Britain.

Prof. F. W. Taussig, of Harvard, followed with a recommendation that the duty be wiped out on coal, iron wire, lumber and pig iron, finally adding billets and steel rails to this list. He thought other steel products should be reduced correspondingly. He praised the Corporation's policy of tempering price fluctuations, a curse of modern times.

## HOPEFUL FEELING

### Prevailed at Manufacturers' Dinner—Address of Judge Gary and Others.

The fourth of the series of dinners given by Judge Gary to the representatives of the leading iron and steel manufacturing concerns of the country at the Waldorf-Astoria hotel, New York, on the evening, Thursday, Dec. 10, differed in some respects slightly from its predecessors.

The previous ones had taken place at a time when the country was going through the strain of a severe panic, with all its attendant uncertainty and difference of opinion among those engaged in the business as to the wisest policy to pursue, while now, with the signs of substantial improvement upon all sides and prosperity again in sight, the discussion of the problems of a year ago gave way to an expression of conservative felicitation upon the success that attended the effort to prevent complete demoralization. That this had been accomplished, all present agreed, and there was a universal feeling apparently that the previous gathering had done much in the direction indicated.

In the beginning of the address, delivered by Judge Gary, following the dinner itself, he took occasion to most cordially thank those present for their acceptance of his invitation to be present.

No part of Judge Gary's address was more impressive, however, than those expressions which referred to the undoubted privilege of manufacturers in similar lines conferring together, exchanging confidences, comparing conditions and deciding upon a uniform course of procedure, when they found it necessary to protect their own rights and interests, and those of their customers and employes alike. This, coming as it did in such a positive and direct way, from one who is a leading authority in America, demanded the closest attention from those present, and was received with great applause.

#### Judge Gary's Address.

Judge Gary spoke in part as follows:

"What is this movement, and up to date what have been its results? The movement has been simply an effort on the part of those interested in the iron and steel industry to establish a basis of friendly association and intercourse which is calculated to enable each to obtain full knowledge concerning the affairs of all the others and the beneficial results which naturally follow such knowledge. In other words, to expose, for the benefit of all, the individual action of each so that every one having a disposition to act reasonably and fairly toward his neighbors may determine his course with full information of all the facts.

"That some, and perhaps many, of the leading thinkers and writers have misunderstood our action is probable. Some at least have questioned the propriety, if not the legality, of our efforts; and apparently others have believed these efforts would be of no substantial benefit. I think I represent the views of all present in saying we have never doubted the propriety or legality of our action because we knew our motives were good. We have never intended to antagonize the laws of the country, or the rights and interests of any one. We have occasionally read published criticisms of our movement on the ground that there was a combination or an agreement in restraint of trade; an agreement, express or implied, to maintain prices, to restrict output, or to divide territory. But the fault lies in the unjustified assumption of fact. As I understand, it is not improper for competitors to meet and without reserve furnish full information and express opinions concerning the business affairs of all, provided they are not acting under an agreement, express or implied. It is not wrong even though any or all may be influenced regarding any particular business, nor even though the result may be to prevent radical and unreasonable changes in prices. It is common practice the world over for men engaged in all the different lines to frequently meet their associates and competitors and to freely discuss conditions and interchange views respecting the proper and reasonable conduct of all concerned. It is not necessary to go into details. The suggestion covers farmers, mechanics, bankers, laborers, merchants, transportation companies, professional people and all others. It includes prices, rates, quantities, amounts, productions, sales, wages, fees, etc., etc. In connection with the movement under consideration we have had no agreement in restraint of trade, express or implied. We have never intended nor resorted to any evasion, and the public has been accurately informed concerning our action. Therefore, we may dismiss this subject with the statement that if we shall be convinced we are wrong in our conclusions, or that we have antagonized public interests, or if complaint is made by any one authorized to make it, we will discontinue our efforts to co-operate whatever injury may ensue.

#### Not Antagonistic to Laws.

"As to the results of our efforts to co-operate there is, I think, no reasonable doubt they have been of great benefit. The prices of the different manufacturers have not been uniform, and the prices of each have fluctuated more or less from time to time. Some manufacturers have not been as considerate of the interests of others as they ought to have been. Perhaps all of us have been influenced by motives of selfishness. But I do not hesitate to say our movement has prevented wide and sudden fluctuations, destructive competition, disaster and failure to manufacturers and their customers, reduction of wages and idleness on the part of employes, all of which, except for our efforts, would have been certain.

"We have been successful in securing stability as opposed to demoralization. This has tended to promote the best interests of ourselves and all others. Whether or not this movement for conciliation and co-operation, as opposed to the unreasonable and destructive competition of the past, shall continue to be successful I cannot say. As a very learned and eminent gentleman said to me within the last few days: 'It is well worth trying.' I have great faith in the future. The world is growing better. Soon it is to be hoped we shall, even in business matters, substitute the principle that 'right makes might' for the old sentiment that 'might makes right.' We ought to be working together and for one another. Each should consider the rights and interests of all others. Let us be a little more generous towards each other. We have established a business friendship which should be permanent and valuable."

Following Judge Gary, J. G. Butler Jr., Youngstown, O., made a forceful and effective address on the subject of the value of a merchant marine to carry American mails, American passengers, American express and American commerce to foreign countries. Mr. Butler was warmly received, and what he said created intense enthusiasm among all present.

Other addresses were delivered by several of those present, special interest attaching to a few in particular.

Chas. M. Schwab referred at length to the constantly recurring discussion as to the prices of steel, and by giving figures and facts made it quite clear that costs today were almost double what they were 15 years ago.

Chas. McVeagh, counsel of the Steel Corporation, created much interest by explaining the efforts that had been made and were being made by that corporation to protect their employes from injury. He gave a statement in detail that was listened to most attentive-

ly, in a way that indicated the audience was surprised and pleased with the showing made.

Mr. McVeagh was followed by Chas. C. Kirchhoff, editor of *Iron Age*, New York. He strongly urged the desirability of those present giving this subject on which Mr. McVeagh had spoken much greater consideration in the belief that it was an effort that was sure to accomplish much good and inspire popular approval.

Other speakers were W. G. Mather, Cleveland; T. J. Drummond, Montreal; Rev. John Wesley Hill, George W. Perkins, New York, and John A. Penton, Cleveland.

## PERSONALS.

President George S. Crawford, of the Tennessee Coal, Iron & Railroad Co., is ill at St. Vincent's hospital, Birmingham, Ala. He is threatened with typhoid fever.

George F. Bainbridge, formerly assistant superintendent of the structural department of the Jones & Laughlin Steel Co., has taken a position as sales agent with the Standard Bridge Tool Co., Pittsburg.

John F. Lewis has been promoted from superintendent of the open-hearth department of the Duquesne steel works of the Carnegie Steel Co., to superintendent of the Donora plant of the American Steel & Wire Co. Samuel Morton succeeds to Mr. Lewis' position at Duquesne.

Allen Gray, of Evansville, Ind., president of the Gray Tie & Timber Co., at a recent meeting of the directors of the St. Louis Car Wheel Co., was chosen president of the St. Louis concern to fill the vacancy caused by the recent death of John W. Nute. The title of general manager was conferred upon J. J. Morse, in addition to his present office of secretary-treasurer.

C. E. Hoyt, instructor in foundry practice at the Lewis Institute, Chicago, has been appointed secretary of the Foundry Supply Association, to succeed Henry M. Lane, resigned. Mr. Hoyt has had considerable experience in the conduct of exhibits of foundry supplies and equipment, having had charge of the two successful shows given under the auspices of the Chicago Foundry Foremen's Association at the Lewis Institute. At the annual meeting of the Associated Foundry Foremen, held in Toronto, Mr. Hoyt was elected secretary of this organization to succeed F. C. Everitt, who resigned owing to the pressure of his business affairs.

## BRAY RESIGNS

### From Presidency of American Sheet & Tin Plate Co.—Succeeded By Pargny.

C. W. Bray, president of the American Sheet & Tin Plate Co. has resigned and will be succeeded Jan. 1 by E. W. Pargny, now holding the post of first vice president of the company. The directors of the company have already met and formally chosen Mr. Pargny to the high office. Other changes in the official staff of the company involved, include the elevation of S. A. Davis, second vice president, to first vice president, the abolishment of the office of second vice president and the promotion of J. I. Andrews, assistant manager of sales, to general manager of sales, C. W. Bennett, assistant to the president, is retained in this capacity with increased duties.

CHARLES W. BRAY.

E. W. PARGNY.

The resignation of Mr. Bray is in effect his retirement from active business, it is announced. He is now erecting a new home near Philadelphia, where he proposes to make his future residence. Mr. Bray is still comparatively a young man, having been born in Pittsburg, Feb. 15, 1864. He was educated in the public and high schools of that city. At the age of 18, he entered the employ of the Lewis Foundry & Machine Co., Pittsburg, as a draftsman, and remained there until 1888, when he became secretary and chief engineer of the Lloyd Booth Co., Youngstown, O. In 1894 he organized the Beaver Tin Plate Co., of which he became president and erected a large plant at Lisbon, O. Upon the absorption of his company by the American Tin Plate Co., he was made chief engineer of the larger company. The consolidation of the American Tin Plate Co. with the American Sheet Steel Co. into the American Sheet & Tin Plate Co. brought him to the office of vice president of the latter company. When John A. Topping resigned as president of the American Sheet & Tin Plate Co. Jan. 1, 1906, Mr. Bray succeeded to the head of the company and has occupied this post up to the present date. As a steel mill engineer, Mr. Bray has attained much prominence. He is the inventor of the Bray continuous mill. Only recently, the prolonged litigation surrounding this patent was decided in his favor.

The occupancy of Mr. Pargny of one of the highest offices in the sheet and tin plate industry of the country, is antedated by a long and thorough experience in this line of manufacture. His first connection with the iron and steel business of Pittsburg was with Apollo Iron & Steel Co. in 1882, when he served in the dual capacity of purchasing and sales agent. After the consolidation of the American Sheet Steel Co., Mr. Pargny was appointed district manager in charge of the Kiskiminetas valley mills, which included the Vandergrift works, the largest sheet plant in the world. At the formation of the American Sheet & Tin Plate Co., he was made second vice president in charge of the commercial department. When Mr. Bray became president, Mr. Pargny succeeded to the first vice presidency, where he has supervised the sales activities in addition to other important duties. Mr. Pargny is a native of Kentucky and was born in 1867.

Mr. Andrews, the new sales manager of the company, is now in the south for the benefit of his health, but is expected to return to the headquarters in Pittsburg in a few days. His health has been greatly improved by his sojourn in the southern climate.

# AMONG MACHINERY MAKERS.

## MILWAUKEE.

### Allis-Chalmers Co. Expects to Employ Larger Force Soon—News Notes.

Milwaukee, Wis., Dec. 14.—As evidence that manufacturing concerns of Milwaukee and vicinity are experiencing a good business and have plenty of confidence for the future, several of the leading plants are increasing their working forces while others are enlarging their plants. The general opinion seems to be that slow but gradual improvement is taking place and that the time is not far off when a normal stage of operation will be reached.

The Pressed Steel Tank Co., of West Allis, a Milwaukee suburb, is grading for an addition, 75 x 150 feet, to its plant. The report that the company had obtained a large order from the Standard Oil Co. for steel tanks, has been denied by officials of the company who state that the addition now being erected is made necessary by a general increase in business.

Eighteen flat cars loaded with structural iron were sent out of Milwaukee last week by the Worden-Allen Co. to a point in Montana where the material will go into a new bridge being erected across the Missouri river on the Pacific extension of the Chicago, Milwaukee & St. Paul railway. The shipment was only the first required by the contract and the second shipment will follow soon.

The Starke Dredge & Dock Co. of Milwaukee, has been awarded the contract for the erection of the new East Water street bascule bridge at the price of $139,785.

The business men of West Allis were entertained recently at a banquet of the Invitation club by the officials of the Allis-Chalmers Co. That the company will easily employ 7,000 or 8,000 men at the West Allis plant in the near future, was the prediction of M. W. Babb, of the legal department of the company. The speaker believed that no other city in the northwest, with the exception of Gary, Ind., has the possibilities of West Allis.

The Heinn Co., Milwaukee, manufacturer of machine specialties, has closed a 10-year lease for the former plant of the Lindeman-Hoverson Co., 348-354 Florida street. Occupation will be made at once.

Harding & Lesser, manufacturers of agricultural implements at the works of the Modern Structural Steel Co. at Waukesha, Wis., will remove their plant to Marinette, Wis., where they will carry on manufacture at the works of the A. W. Stevens Co., after Jan. 1.

A gas producer which has been put into successful use by the United States government has been manufactured by the Power & Mining Machine Co., of Cudahy, a Milwaukee suburb.

The gas engine departments and the foundries of the Fairbanks-Morse Co. at Beloit, Wis., have resumed operations. Orders have been increasing of late and the prospects have greatly improved.

Five hundred men of the employes of the Fairbanks-Morse Mfg. Co., of Beloit, Wis., recently gathered to bid farewell to H. M. Ramp, retiring superintendent of the shops. Mr. Ramp will be located at Springfield, Mo., where he will be general superintendent of the seven plants of the United Iron Co. Stanton Griffith, former superintendent of foundries at the Fairbanks-Morse plant, lately of Cincinnati, O., has taken the place of Mr. Ramp.

The Owen Thomas Motor Car Co. is contemplating the establishment of a large automobile plant at Janesville, Wis., where a new line of cars will be manufactured. The company at present occupies the former C. & N. W. shops, which are to be razed to make room for yards.

The addition to the Hudson & Sharp machine shop at Green Bay, Wis., is fast nearing completion. A large traveling crane and several lathes are a part of the new equipment which is being installed. When completed, the shop will be the largest and most modern in Green Bay.

## CINCINNATI.

### Orders for Special Machinery—Moderate Business Anticipated.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., Dec. 15.

Orders the past week have not been materially increased and business in machine tools is quiet, but there are a number of inquiries, which though slow to close and develop into actual sales, furnish ground for regarding the outlook with hopefulness. It is noticeable that orders for special machines are better than for stock types, in both the wood working and iron working lines. Some builders of small tools are well supplied with orders and are making sales daily. The manufacturer is disposed to regard the present situation as one which will gradually develop into activities, but it is not expected that 1909 will witness a return of the boom period which prevailed early in 1907. Most of the manufacturers expect to do in 1909 about 65 to 75 per cent of their maximum capacity, at least expressions are freely made that ability to operate on that basis would be entirely satisfactory and would be as much as is hoped for.

But little is expected of the market until after the holidays and the fact that the situation has continued quiet, following the little spurt of buying which came in after the election, has not disturbed confidence in the future, and a feeling of cheerfulness and expectation of increased business prevails. At the dinner of the Cincinnati Metal Trades Association, the depression was referred to as a thing of the past and the comment was along the line of business opening up again. This attitude is helpful to the situation, as it is promotive of encouraging increased effort.

M. L. Andrew & Co. has received some good orders for special wood working machines during the past week.

The Southern Iron & Steel Co., a new organization with a capitalization of $150,000, will place an establishment on the site of the old water-works plant on Front street. It is understood that George M. Skiles will be president of the company; J. W. Wolf, vice president; L. B. Sawyer, secretary and treasurer; and Joseph Goldberger, general manager. Another of the incorporators is T. G. A. Green. Mr. Skiles and Mr. Green were formerly of Shelby, O. The location of the plant will give the concern good railroad service and wharfage. It is intended to do a general iron and steel business, utilizing the river transportation, thus furnishing cheap transportation between Cincinnati and Pittsburg. Arrangements are now in progress for the construction of a large plant with modern equipment and mechanical devices for handling iron and steel.

A new machine tool manufacturing campany has been organized which will be known as the Acme Machine Tool Co. The incorporators are C. H. M. Atkins, of the Warner Elevator Co. and E. N. Atkins and others. The plans of the new company are not yet

sufficiently developed for it to announce its intentions fully, but it will take over the present plant of the Cincinnati Planer Co. on Buck street and will occupy the plant when the Cincinnati Planer Co. moves to its new plant in the Factory Colony at Oakley.

Robert Wuest, commissioner of the National Metal Trades Association, has left for Havana for a vacation trip. He will be absent two or three weeks.

## NEW YORK.

### Machine Tool Activities Confined to Small Sales.

Office of THE IRON TRADE REVIEW, Room 1005, No. 90 West St., Dec. 15.

The local machine tool trade manifests little change, activities still being confined to small sales, which however, are sufficiently numerous to give a very fair aggregate of business. It is hoped that the entrance of the railroads into the rail market means the beginning of purchasing in other lines and that some important buying will result from the generally run down condition of railway shops. With a good many machine tool builders the improvement in business has not brought much of an advance in manufacturing activities, as current selling has been largely from the heavy stocks accumulated during the depression.

A large foundry is to be erected in the New Jersey district suburban to New York for the Smith Mfg. Co. The size of this project may be judged from the fact that 500 tons of steel will be required for the buildings. Westinghouse, Church, Kerr & Co., 10 Bridge street, New York City, have the engineering work in charge.

The Screw Cutting Co. of America has purchased an irregular tract of ground at Seventeenth street and Sedgley avenue, Philadelphia, and will shortly erect a large factory building.

Schalkenbach & Budke, 402 Claremont avenue, Jersey City, N. J., have completed the equipment of their plant at Westside avenue station on the Central Railway of New Jersey and are ready to estimate on general and structural iron work. They manufacture the Cyclopean bottom dumping buckets and special metal conveyors.

## CLEVELAND.

### Steady Improvement—New Construction—Some Good Orders.

Office of THE IRON TRADE REVIEW, Browning Building, Dec. 15.

Machinery dealers and manufacturers about Cleveland are enjoying a steady increase in business and look toward the future with that confidence which helps to assure prosperity. Optimism has caused many of them to add to their shops in preparation for better times which they feel must come in the spring. Many manufacturers instead of distributing their orders are running full time and working on orders as they are contracted for, trusting that in the near future business will have reached its normal stage and factories will be operating to their full capacities.

The Bruce-Meriam-Abbott Co. has recently received the following contracts: Two 125-horsepower vertical four-cylinder natural gas engines to be shipped to Salamanca, N. Y.; one 125-horsepower producer gas engine to be shipped to McHenry, Ill.; one 135-horsepower producer gas engine to be shipped to Milwaukee, Wis.; one 135-horsepower engine to be shipped to the Willard Storage Battery Co., of Cleveland; one 55-horsepower and one 15-horsepower to be shipped to the Corpus Christi church, Buffalo, N. Y., and one 27-horsepower engine for the Starr Plating Works of Buffalo, N. Y.

The Long Arm System Co. contemplates doing a rushing business by the first of the year. The company is busily engaged in the manufacture of automobile parts and will soon be running full force.

Business for the Ajax Mfg. Co. is steadily increasing with December better than any previous month of the year. A contract has been entered into requiring two forging machines and a bulldoser for a railroad. Many more inquiries are coming in than formerly, and old men are continually being taken back upon the pay roll.

The Globe Machine & Stamping Co. is now doing a business equal to 90 per cent of that of the banner month of 1907, a year of abnormal prosperity. The nature of its manufactured products does not permit of unusually big orders, but the great number of small ones more than makes up for this.

Several good orders from railroads and shops connected with them have been received by the Foote-Burt Co. December promises to be the best month of 1908, and the increased business, a large amount of which is from firms not heard from for over a year, has necessitated the taking on of more men and the working of more hours.

The Peerless Motor Car Co., which recently moved into its new assembly and paint shop, is now building a new repair shop. The repair shops will be 53 feet wide by 130 feet long, three stories, and will cost in the neighborhood of $35,000. The frame work will be all of steel with girders spanned across the building, making a total of 230 tons of structural material. Floors will be built of reinforced concrete, with a wood top; an 18,000-pound elevator with dimensions 12 feet wide by 20 feet long, and a 35,000 gallon water-tower will be installed. The third floor is to be divided up and used as a physical and a chemical laboratory. The construction is under the supervision of the McGeorge Engineering Co.

The Walworth Run Foundry Co. is building a new addition which will be 50 x 110 feet, costing about $7,000. Electric power mills for the cleaning of castings have been provided for. The company is now doing a good business, working full time and force, but the new building which is going up will make it necessary to employ at least 40 more men.

At a mid-year meeting of the National Supply and Machinery Dealers' Association, held at the Hollenden hotel of this city on Dec. 2, it was practically decided to hold the next meeting at Pittsburg, on May 12, 13 and 14, 1909. Although the definite action was not taken by the Southern Supply and Machinery Manufacturers' Association and the American Supply and Machinery Manufacturers' Association, both will undoubtedly meet in Pittsburg on the same date.

The Chandler & Price Co. is doing an increased business. During the past week, six carloads of machines were shipped out, a volume of business which approaches the total capacity of the company for a week. Several machines have recently been sent to Australia, while the American orders are distributed over every portion of the country.

## PRACTICAL EDUCATION

### And Co-operation Discussed by Cincinnati Metal Trades Association.

The Cincinnati branch of the National Metal Trades Association held its quarterly meeting and dinner at the Business Men's Club in that city on Thursday evening, Dec. 10. About 125 members and guests were present and the meeting was regarded as one of the most interesting of these functions that has been held for a long time.

President John W. Neil, of the McGowan Pump Co., presided and officiated as toastmaster.

A concise report of the previous meeting was read by Secretary John M. Manley, who also referred to the highly important character of trade schools and co-operative educational systems as being constructive and defensive propositions of great merit. The association was advised that rec-

ommendation had been sent to members of the National Metal Trades Association, that the revised constitution, as submitted, receive favorable consideration and be adopted. This action was taken after further consideration of the propositions involved and which at the outset the Cincinnati branch did not favor; but upon reconsideration had decided to concur in. The business portion of the meeting being thus concluded, Chairman and Toastmaster Neil gracefully introduced Governor-elect Judson Harmon. Mr. Harmon's address was notable for its simplicity and was in no sense a speech, as he frankly stated that he intended to make only a talk as to his friends and neighbors. He referred to the value of organization and complimented the association upon the success it had achieved in standing together and meeting issues of mutual importance to men engaged in one line of industry. He said that it gave him pleasure to witness such a scene, showing that men competing for business could meet on such an occasion in a spirit of good fellowship, and referred to the time gone by when competitors in business were often personal enemies largely from lack of mutual acquaintance and opportunity for social contact. It was his belief that membership in organizations such as this was an incentive to the individual member to strive to reach the plane of the best and most successful men in his line of industry, and that the emulation of the successful men was a worthy undertaking. He declared that it was his purpose and aim when he should take his seat as governor of the state to make his administration a business one and not a political one; and that in facing the business problems that would confront him he wanted the assistance of such men as he was now addressing, men who had forged to the front by the constant, successful solving of problems. "One of the most important problems that confronts me," he continued, "and which will be the hardest to solve, concerns the Ohio state penitentiary. The problem of the future, when contracts expire, is to keep the convicts at work, as the law prohibits the employing of contract convict labor." It will be difficult to so conduct the penitentiary as to be able to furnish the men with work without doing injury to individuals and interfering with business. The governor-elect was cordially received and his remarks generously applauded.

Prof. Frederick C. Hicks, of the University of Cincinnati, spoke on the subject of commercial education, which in a sense was a new branch, which sought to teach the young man such useful branches of business as accounting, business law, finance, stock and bond issues, rate making and tranportation. He asked the association for assistance in the development of this branch of education.

H. W. Hoyt, of the Great Lakes Engineering Co., of Detroit, was next introduced and spoke on behalf of the administrative council of the National Metal Trades Association. Mr. Hoyt said that the meeting made it plain to him why the Cincinnati branch was so influential in the affairs of the National Metal Trades Association, as it could be readily seen that the members of the Cincinnati branch were harmonious and had a large and enthusiastic membership. He took occasion to compliment the Cincinnati branch upon its action in recommending the adoption of the new constitution of the National Metal Trades Association. He said that the national association would not always be a militant organization, but would always be a great agent for industrial peace. The tendency and work of the association would in time achieve the freedom of workmen from the closed shop and when the open shop for American workmen has been established, the object of the association would be used in efforts to improve the lot of the American workman; with a view to establishing a relationship provided on a basis of equity for the workman and the employer.

A. V. Perrson, director of the Solvay Mechanics' School, of Syracuse, N. Y., which was established and is supported by the Solvay Process Co., was introduced and stated that his visit to Cincinnati was for the purpose of investigating the co-operative engineering course in practice in connection with the Cincinnati University. Mr. Perrson expressed himself highly pleased with the plan and would recommend to the directors of his institute that a similar plan be adopted in Syracuse.

Edward Robinson, professor of mechanical engineering of the University of Vermont, was next introduced and stated that his object in visiting Cincinnati was to investigate the co-operative educational system which Prof. Hermann Schneider had introduced. He said that engineering courses had failed in the past, as a rule, to give full results because of the lack of actual, practical work for the student. He commended the co-operative educational system highly and said that the plan was not only important for engineering enducation, but marked a great advance in education generally, as it was calculated to fit the student for profitable employment and life in his own locality.

Prof. John L. Schearer, of the Ohio Mechanics' Institute, was the next speaker. He paid a high tribute to Mrs. Emery, whose magnificent gift of $500,000 to the institute for a new building had furnished the means for the proper development of his long-cherished plans. He reminded the association of its promise, made three years ago, to equip his work shop with machine tools when he was able to secure funds for the building and President Neil advised Mr. Schearer that a committee had been appointed for that purpose of which F. A. Geier, of the Cincinnati Milling Machine Co., was the chairman. At the close of his address, Prof. Schearer announced that one of the features of the new institute building would be a department for the exhibition of Cincinnati products, especially machine tools, but that there was no intent to make such an exhibition room a revenue earner, as Mrs. Emery's gift was clearly understood to be a gift to the city as well as to the institute.

Prof. Hermann Schneider, of the Cincinnati University, made a brief talk on the wide attention which the co-operative engineering course of the university was attracting and referred to the visit of Mr. Hammerschleg, of the Carnegie Technical Institute, this week, as another educator interested in the proposition.

John M. Manley, secretary of the association, referred to the great value of the co-operative course and its work. He urged the members of the association to abide by and comply with all the rules of the organization, as in so doing the objects for which they were striving could be best accomplished.

F. A. Geier, of the Cincinnati Milling Machine Co., closed the meeting by gracefully thanking each of the speakers, in turn, for the pleasure and instruction they had afforded the members and guests.

It was the universal comment at the close of the dinner that the affair was one of the most enjoyable and successful meetings ever held by the Cincinnati branch. The entertainment committee was highly complimented upon the menu and the arrangements. Mr. Neil as toastmaster was at all times happy and graceful in introducing the speakers.

## STACKS BLOW IN

**And Hanging Rock Region Plants Increase Their Output.**

Ironton, O., Dec. 12.—The past week has witnessed considerable stimulation in the industrial activity of this territory and the closing month of the year will see nearly all the blast furnace stacks in operation.

The new 250-ton stack of the Ironton Iron Co. went into blast Nov. 23 and the work of the new furnace is fully up to the expectations of the owners.

The Bird Iron Co. put its stack at Culbertson into blast Nov. 27 with prospects for a steady run of some months at least.

The Belfont Iron Works Co. furnace in Ironton, which had been out for some months for repairs, went into blast Nov. 30.

The only stacks now idle in this district are the two at Ashland and the plant of the former Union Iron & Steel Co., recently taken over by Rogers, Brown & Co. This is undergoing extensive remodeling in preparation for blowing in. The company has sent a construction force to Richwood, Tenn., to dismantle and ship here two large engines to take the place of the old ones at the plant.

The Hanging Rock Iron Co. will likely blow out its Hamilton stack in the near future. This furnace has on four immense yards at Hanging Rock the largest stock of pig iron probably ever had by any one furnace at one time in the history of the Hanging Rock region.

The directors of the Ironton Malleable Co. have held several meetings recently to discuss the advisability of putting their new plant in operation, but no definite decision as to date of resumption has been reached.

The billet and rod mills of the Ashland Steel Co. are actively engaged and the steel works is working in practically all departments. The plant of the Portsmouth Steel Co. also continues in operation.

Frank Elbert, of Marietta, is promoting the location of a cast iron sewer pipe plant at Wellston. The project has not reached a definite form.

The Ashland Steel Co. recently established a new record for output, when one turn in the blooming mill department rolled 328 tons of steel in 12 hours and the same turn in the converting department made a total of 67 heats in the same length of time.

A reappraisement has been ordered by the common pleas court at Portsmouth in the matter of the United States Steel Corporation against the Portsmouth Pressed Steel Co.

At the last meeting of the stockholders of the Ashland Iron & Mining Co. and the Ashland Coal & Iron Co., S. G. Gilfillan, of Ironton, John Peebles, of Portsmouth, and E. C. Means, of Low Moor, Va., were added to the directorate. Both companies organized with the old officers.

The Globe foundry at Huntington, W. Va., erected at a cost of $75,000 and handicapped by lack of operating capital, may be rejuvenated by the Huntington chamber of commerce, which is trying to interest eastern parties.

Tests of phosphorus iron ore from the Hamden field, on the property of the Puritan Cement Co., now erecting a large plant near Hamden, are said to have been satisfactory and that the Buffalo Iron Furnace Co., of Detroit, had placed a trial order for 50 tons of the ore, with prospects for future contracts. The Babcox-Wilcox Boiler Co. has erected two 400-horsepower Stirling water tube boilers and a new 125-foot stack for the power plant of the Puritan company. The slag deposits from the old Hamden furnace are being used by the Puritan company for making concrete and are proving a success.

The Portsmouth Machine & Casting Co. has purchased the patent rights on a new pattern of gasoline engine and is now making a 75-horsepower engine of the new design. The engines will be manufactured on an extensive scale.

It is understood to be the intention of the Portsmouth Steel Co. to enlarge the corrugated iron tie plate mill at its plant, upon the suggestion of the Spencer-Otis Co. of Chicago, which handles the output. There has also been a revival of the talk that the steel company may erect a blast furnace in conjunction with its plant.

The final report of the receivers for the Ohio Stove Co. shows that the property and assets of the company total $64,517.83, and that the claims against the company, including those not proven, amount to $26,041.96.

While no official confirmation of the report is available, it is said that Rogers, Brown & Co. have had under discussion the advisability of connecting their Hanging Rock and Ironton plants by rail, a distance of three miles.

## BUSINESS IMPROVING,

**But Still Far Below Normal in the San Francisco District.**

(Special Corespondence.)

San Francisco, Dec. 4.—The shorter work day went into effect three days ago. It is 8¾ hours a day now instead of 9 hours as prior to Dec. 1, and the men are happy.

All shops and foundries affiliated with the California Metal Trades Association lived up to the agreement made 18 months ago with the unions through the Iron Trades Council, and many shops not affiliated with the association inaugurated the shorter work day.

Much is expected by local manufacturers from contracts for the municipality. Millions will have to be spent in constructing the auxiliary water works for fire protection, to be followed by a gigantic water supply system, with a source many miles distant from San Francisco, and many other works requiring machinery, pipes and other manufactured iron amounting to several millions. The bonds for those improvements have been ratified by the people, and the first batch offered for sale was readily taken up at a favorable bonus.

When it came to let the contracts, some eastern manufacturer outbid the lowest local competitor, and the contract must go to the lowest bidder, according to the city charter provision. The Iron Trades Council adopts resolutions urging the authorities to give local bidders preference in awarding contracts, ignoring the charter provision, but it does not explain why a manufacturer living 3,000 miles away can outbid a San Francisco competitor, in spite of the distance and the additional cost of freight the eastern manufacturer must figure on, and the necessity of having men in this city to deliver and install the work.

The Union Iron Works Co. has gone into the gold dredging machinery business, and has received an order from Marysville for dredging machinery amounting to $75,000.

Business is improving and work increasing, though far below the normal, and about one-half the force is employed in the iron trade as compared with the time of the strike, 18 months ago. The trade which was then diverted from this city has not yet returned. Work in other lines is increasing at a better rate than in the iron trades.

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The strike at the plant of the South Baltimore Steel Car & Foundry Co., Baltimore, Md., ended Dec. 1.

# AN INDUSTRIAL WATER SUPPLY FOR THE YOUNGSTOWN DISTRICT

The manufacturing district located in the Mahoning valley and extending from Niles on the west through Girard and Youngstown to Struthers on the east possesses many advantages in the line of railroad connections, proximity to raw material supply and to markets for the finished products. The district, however, has in time past suffered from a lack of that prime necessity for a good manufacturing location, namely, a plentiful supply of good water, both for city use and for manufacturing purposes. Practically the only available supply heretofore has been the Mahoning river. Not only has this supply been unsatisfactory, due to the pollution suffered by it in its long course from Alliance down to Youngstown, but the quantity has been none too plentiful. During the drouth of the past summer, the water in the river became so low that plants were forced to shut down in many places and the city of Alliance, which also draws its supply from the river, was at one time without any water, except such as was conserved in the standpipe of the city water works as a protection against fire.

The quantity of water used by the various plants in the Youngstown district alone is enormous. These plants follow one another in close succession on both banks of the Mahoning river from Girard all the way down to Struthers. The demand of any one of the large plants, such as the Ohio works of the Carnegie Steel Co. was sufficient to use all the water contained in the river at the height of the drouth. As a matter of fact it was a common saying in Youngstown that all the water which came down the river first passed through the pumps of the Ohio Works.

In view of the conditions existing in the district, the establishment of a new source of supply of ample magnitude to meet the demands of the many manufacturing industries, and to possibly serve as a source of supply for the city of Youngstown itself, is of no little interest. Various plants have been considered from time to time for impounding the water in the Mahoning river by dams at various places and letting it out in times of drouth, so regulating the flow in the river that an ample supply would be available at all times. These schemes involved the erection of dams across the river at one point or another, depending upon the views of the promotors of the particular scheme in question. One in particular contemplated the erection of a dam at Alliance, a distance of some 57 miles up the river. The value of these various schemes has been more or less problematic, and, as yet, none of them have been carried into effect.

Meantime, while these various schemes for impounding the water of the Mahoning were under consideration, another water project was conceived, plans and surveys made and the work executed, so that today a water supply exists in which eventually a total of two billion gallons will be impounded in three lakes just south of the town of Struthers, and which gives a head of 160 feet above the center of the public square at Youngstown.

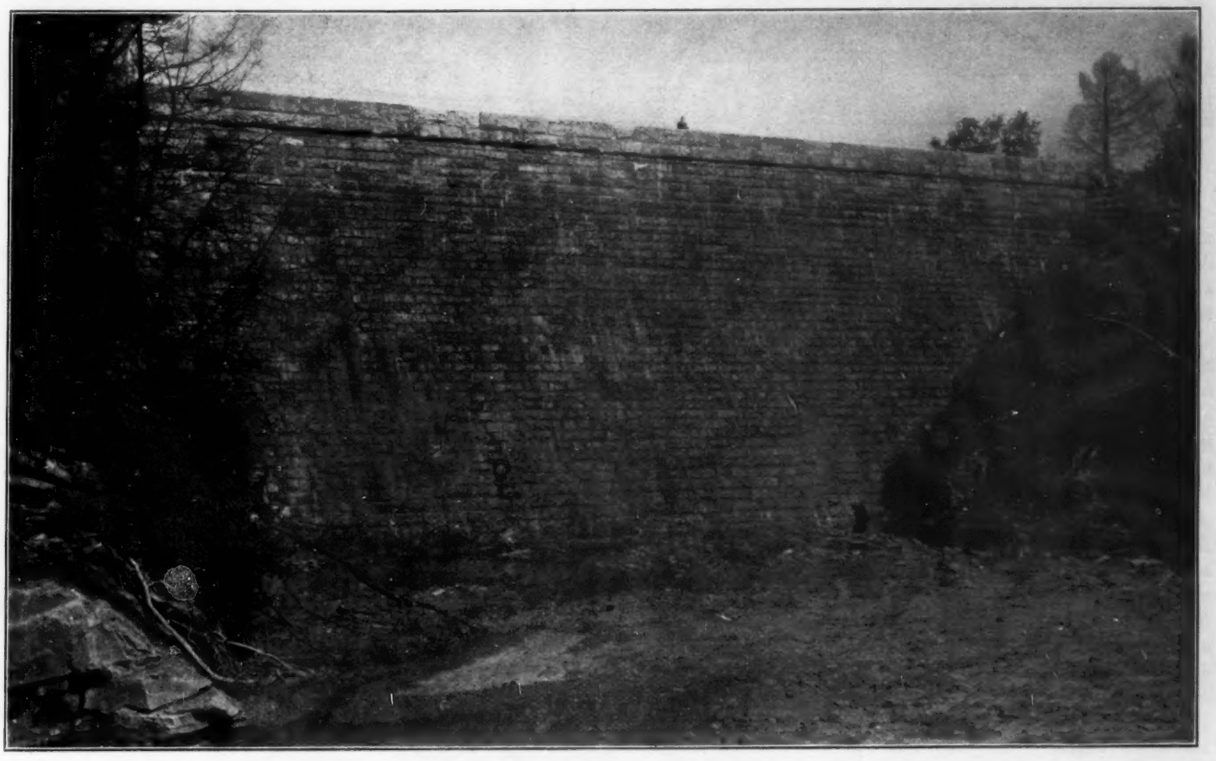

FIG. 1—FACE OF DAM NEAR STRUTHERS.

The Mahoning river is fed at various points by creeks. One of these, known as Yellow creek, enters the Mahoning at Struthers about five miles east of Youngstown. The creek has a course of, approximately, due north, and drains a water shed of about 46 square miles. Its source was through a narrow ravine, the walls of which rise from 60 to 75 feet above the bed.

The Mahoning Valley Water Co., a couple of years ago, secured the water

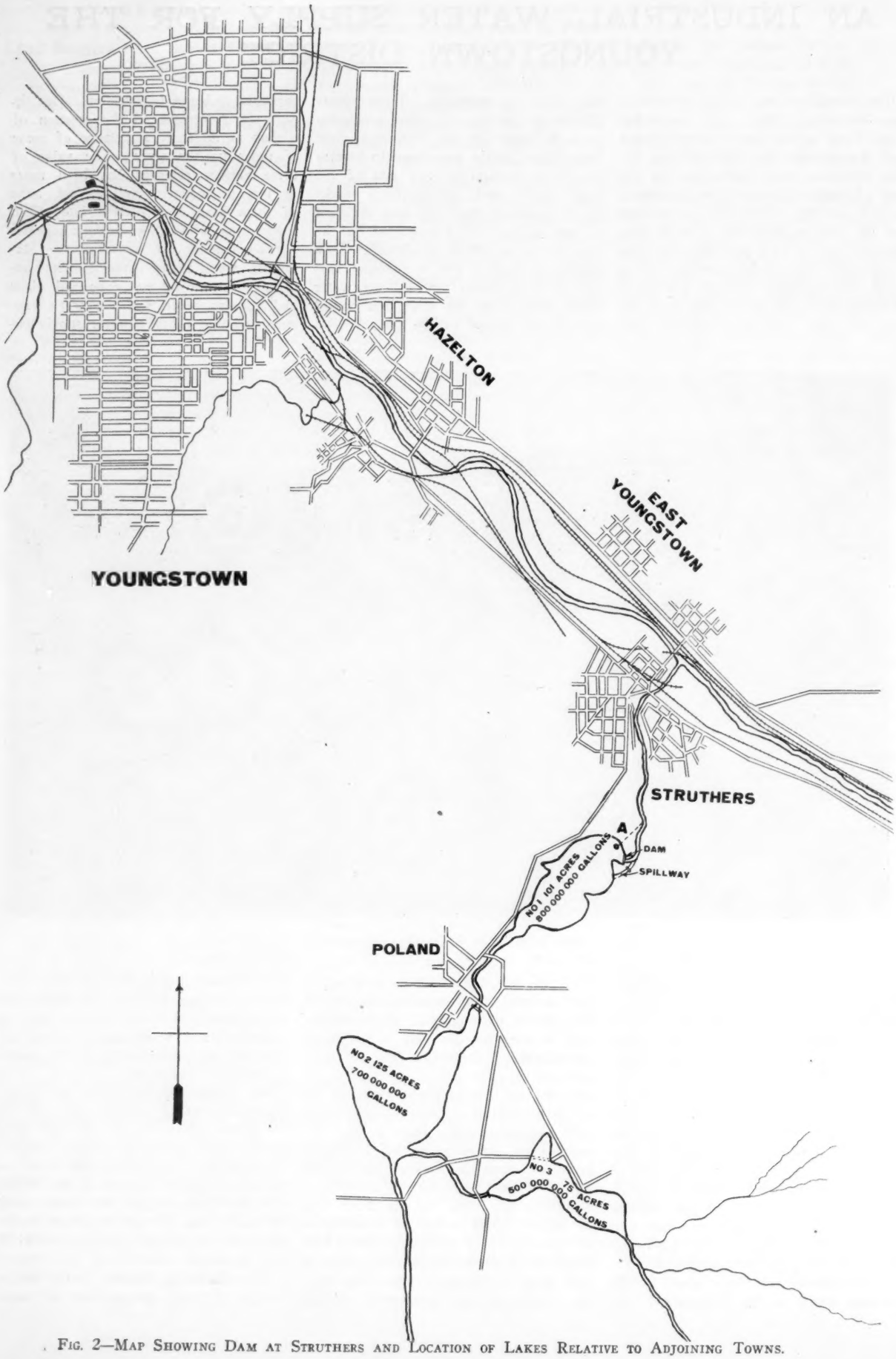


FIG. 2—MAP SHOWING DAM AT STRUTHERS AND LOCATION OF LAKES RELATIVE TO ADJOINING TOWNS.

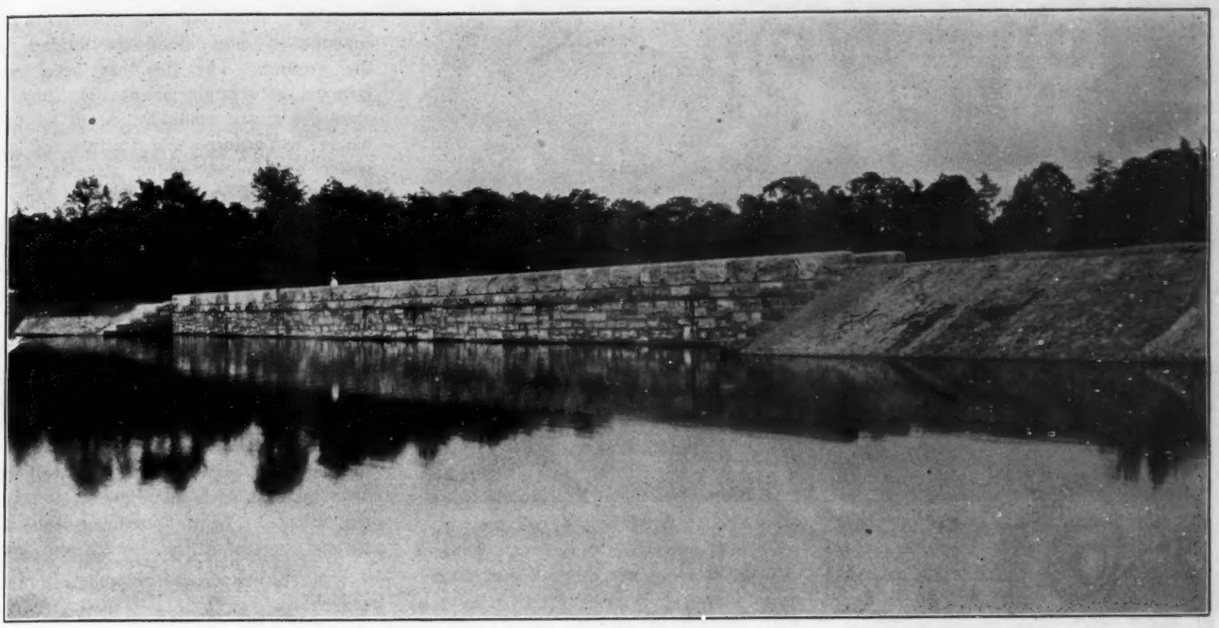

FIG. 3—VIEW OF DAM FROM LAKE, SHOWING PAVED BED OF LAKE ADJOINING DAM.

rights to this stream, and about 1½ miles south of Struthers, erected a masonry dam across the ravine. This dam causes the water to be backed up so as to form a lake shown in the accompanying plan as lake No. 1, with an area of 101 acres and a storage capacity of 800,000,000 gallons. It is proposed in the near future, as the demands for water increase, to erect another dam in the vicinity of the village of Poland forming lake No. 2 with an area of 125 acres and a capacity of 700,000,000 gallons. A third dam also to be erected will form lake No. 3, with an area of 75 acres and a capacity of 500,000,000 gallons.

The dam erected to form lake No. 1 is shown in one of the accompanying illustrations. It is of Ashler masonry, and one of the largest in the middle west. Experts have pronounced it to be one of the finest examples of stone work in the United States. The dam has a height from base to crest of 70 feet and a thickness through the base of 45 feet. This tapers to a thickness at the top of 10 feet, the cross section being as shown in Fig. 8. The dam has a length at the top of 240 feet with two stone railings on either side, forming a 6-foot walkway across its crest. A separate channel has been cut, as shown in the general plan, and a smaller dam erected to form the spillway. However, for draining the lake, if such a course should ever become necessary, a culvert has been placed at the bottom of the main dam fitted with a 30 x 36-inch Coffin valve operated from a gate wheel at the top of the dam.

The formation of the ravine, across which the dam was built, is solid rock, both sides and bottom. The dam was dove-tailed into the bottom, as shown, and also let in to the sides of the ravine. While the faces of the dam are of Ashler masonry, a rubble center is used. Most of the stone used in the construction of the dam was obtained in Beaver, Pa., and, owing to the inaccessibility of the place for ordinary transportation means, was teamed to the dam site. The bed and sides of the lake are of stone. They are so precipitous that 165,000,000 gallons of water may be drawn from the lake without uncovering more than five acres of surface. This is due to the peculiar formation of the ground forming the lake bed. The spillway dam has a width between abutments of 140 feet and a height of 15 feet. It is built of stone and Portland cement.

By referring to the general plan, it will be noted that just below the dam the course of the creek takes a sharp bend of about 90 degrees, leaving a wall of rock at about the point marked A on the plan. A cross section of this wall along the line shown at A is given in Fig. 4. A tunnel, 6 feet square, and, approximately, 210 feet long, has been driven through the rock about as shown in the illustration, Fig. 4. One end of this tunnel terminates in a gate house set in the lake, as shown in the illustration, an exterior view being given in Fig. 6. The gate house is 15 x 20 feet, and has a height from the base to crest of 78 feet. It is broken Ashler cut stone, and provided with a partition through the center in which are placed four Ludlow gate valves 24 x 24 inches and set staggered across the width of the gate house and at an elevation shown in Fig. 4. In the

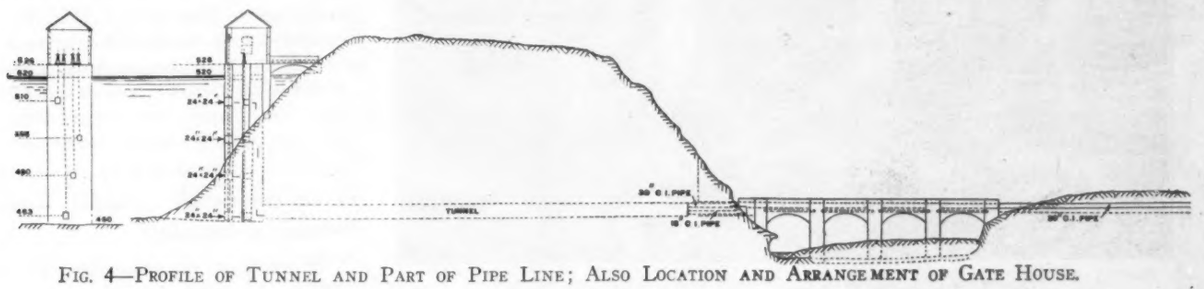

FIG. 4—PROFILE OF TUNNEL AND PART OF PIPE LINE; ALSO LOCATION AND ARRANGEMENT OF GATE HOUSE.

FIG. 5—TOP OF DAM, SPILLWAY IN DISTANCE AT LEFT.

aqueduct, shown in Fig. 7. From the aqueduct it runs along the surface of the ground. The line has been constructed as straight as possible, and all turns in it are made by means of long bends to reduce the friction of the water and avoid undue stresses. The course of the ravine from the dam to the Mahoning river is tortuous, and the pipe line of necessity crosses the stream a number of times in its course. At such crossings, the line is carried on concrete piers, and usually a wall has been built on the up-stream side of the pipe line, and immediately adjoining it, so that in times of freshet the pipe line is in no danger of being ruptured by the heavy flow of water over it. At the end of each crossing a wall has been built at such an angle as to cause the water to be deflected out into the natural course of the stream and away from the pipe line. This is to prevent the water taking the straightest course down the ravine in times of flood and undermining the line with consequent danger of rupture.

outer wall of the gate house, and opposite the valves are four openings with copper screens, through which the water must pass before entering the pipe line. By shutting off the water with the Ludlow valves, it is possible for men to enter the tunnel for the purpose of inspecting it and the end of the pipe line.

In the opposite end of the tunnel from the gate house are cemented a 10, an 18 and a 30-inch pipe line. The 10 and 18-inch lines are blanked, and from the 30-inch line a 24-inch pipe line connection has been made, which is carried down the ravine to furnish water to the town of Struthers and to industries in the valley. The pipe line, as it leaves the tunnel and crosses the ravine, is carried on a cut stone

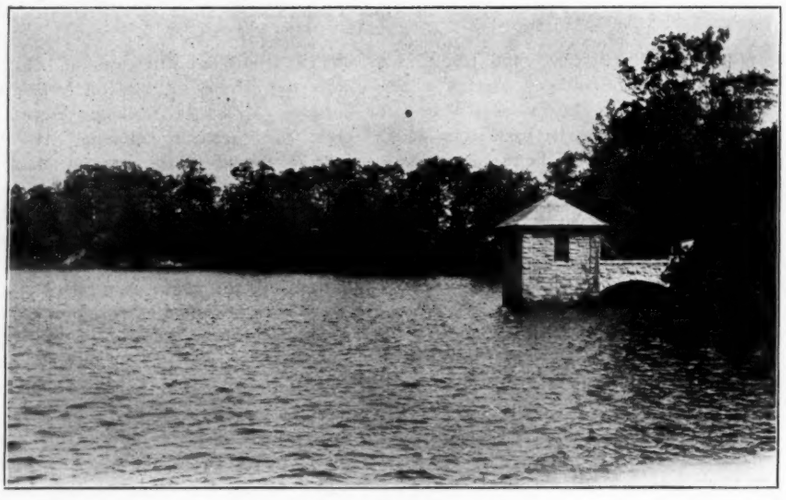

FIG. 6—GATE HOUSE IN LAKE.

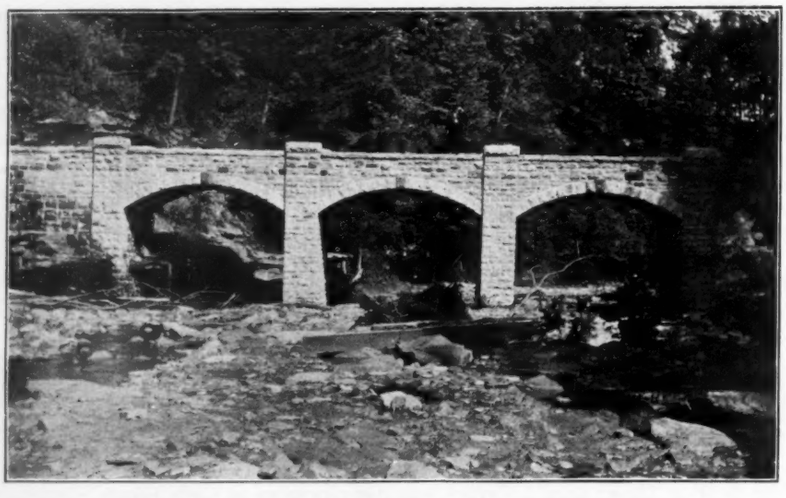

FIG. 7—AQUEDUCT CARRYING PIPE LINE ACROSS RAVINE.

Returning for a moment to a consideration of the lake. This has a depth immediately behind the dam of 60 feet, and in its normal condition, a height above Struthers of 150 feet. The natural inflow to the lake is such that 6,000,000 gallons can be discharged from it every 24 hours. The water is soft and clear, and free from stain. It has no scale forming constituents, as has been demonstrated by its actual use in the boilers of a number of the industries at Struthers.

In addition to supplying the industries in the valley, the water company

has obtained a franchise to supply and is now furnishing domestic users in the town of Struthers.

A number of industries also are using the water, the company being able to furnish it at a low rate.

The pipe line laid through the town is 18 inches diameter, and in connection with these lines 20 Matthews fire hydrants have been installed giving adequate fire protection to the town.

When the two additional dams mentioned above are built, there will be possible a discharge of 20,000,000 gallons every 24 hours, which is adequate to supply a population of about 180,000. However, the primary aim of the water company is to supply water for steam making purposes and for the large number of iron and steel industries located in the valley.

The personnel of the company comprise Lucius E. Cochran, president; Frederick B. Hamilton, vice president; Mason Evans, treasurer, and James J. McNally, secretary. These with Lucius E. McKelvey constitute the board of directors, and D. M. Wise is engineer of the company.

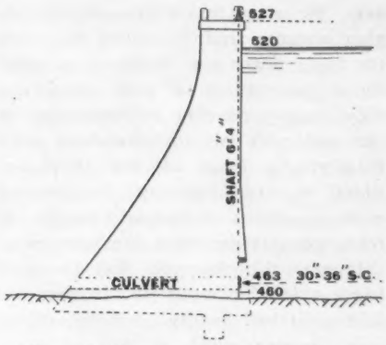


FIG. 8—SECTION THROUGH DAM.

# THE MANUFACTURE OF STEEL FOR CASTINGS[1]

BY DR. BRADLEY STOUGHTON[2]

The United States contains about 170 active foundries devoted to the manufacture of steel castings, not including other steel plants where castings are occasionally produced, incidental to their regular business. Of these 170, about 101 can make open-hearth castings, 43 can make Bessemer converter castings, and 45 can make crucible steel castings, while the number of furnaces of the different kinds are: Acid open-hearth, about 85; basic open-hearth about 90; converters, the producing equivalent of about 27,[3] and crucible melting pots about 750. The tonnage of the different kinds of steel produced in 1904 and 1907 is shown in Table I. Even the astonishing percentage increase in the production of total castings is less significant than the increase in castings made by the basic process. This condition of affairs is too well known to require more than a passing mention, and is reflected in the production of steel for purposes other than castings, as shown by Table II. In short, it is now recognized that the growing scarcity of low-phosphorus ores, in comparison to the ever-increasing demand for them, is rapidly forcing upon all the steel manufacturers of this country the only process available to them for the reduction of phosphorus. Whether this circumstance is or is not a benefit to the steel casting industry is one of the objects of this paper to study.

**Table I—Steel Castings and Total Steel Produced in the United States.**

| | 1904. Tons. | 1907. Tons. | Increase, Per cent. |
|---|---|---|---|
| Acid open-hearth castings | 203,915 | 379,401 | 86 |
| Basic open-hearth castings | 98,919 | 366,476 | 270 |
| Bessemer converter castings | 16,051 | 33,300 | 107 |
| Crucible castings (estimated) | 3,000 | 6,000 | ... |
| Total steel castings | 321,885 | 785,177 | 146 |
| Total steel, all kinds | 13,859,887 | 23,359,637 | 70 |

**Table II—Production of Acid and Basic Steel in the United States.**

| | 1904. Tons. | 1907. Tons. | Increase, Per cent. |
|---|---|---|---|
| Acid open-hearth | 801,299 | 1,269,773 | 58 |
| Basic open-hearth | 5,106,867 | 10,279,315 | 101 |
| Bessemer converter | 7,859,140 | 11,667,549 | 48 |
| Crucible | 92,581 | 143,000 | 55 |
| Total | 13,859,887 | 23,359,637 | 70 |

[1]A paper presented before the Pittsburg Foundrymen's Association, Dec. 7.
[2]Columbia University, New York.

[3]The actual number of active converters is close to 60, but the majority of these are not capable of continuous production, so their producing efficiency is much less.

## Characteristics of the Acid Open-Hearth Process.

The distinguishing features of the acid open-hearth process for making steel castings are:

An acid slag with the consequent inability to purify the metal from phosphorus or sulphur. This acid slag is a much less energetic oxidizer than is the basic open-hearth slag, with the result that the purification is less rapid and the steel also is less oxidized at the conclusion of the process (other things being equal). Furthermore, the amount of acid slag is only about one-half that of the slag in the basic open-hearth process, so that the blanket of heat between the flame and the metal is thinner and the heat efficiency is greater in the acid process.

The amount of steel scrap used in the acid process is much greater than in the basic, which is the result of two conditions just mentioned, viz.: the heat efficiency being high we can quickly melt a more infusible charge than is possible in the basic furnace, and the purification being slow, it is desirable to have less pig iron in the charge. The acid open-hearth process thus approaches a mere remelting process and, in this respect, resembles the crucible process, the chief differences being the larger size of charge and the fact that the metal is exposed in the same chamber as the flame.

Recarburization may take place in the acid furnace, but must be effected in the ladle in the basic process.

## Flexibility of Composition and Tonnage.

The flexibility of chemical composition of open-hearth steel (both acid and basic) is very slight. Generally all the charge is "dosed" to the same composition and all the castings made from that heat must be alike. This greatly increases the difficulty of making steel castings of special carbon contents, or of alloy steels, because just enough castings to take the whole charge of a furnace, and no more, must be made ready from orders requiring the special material, and, even then, the scrap and risers must be kept separate in certain cases, as, for example, after making nickel steel.

The flexibility of both the acid and basic open-hearth process in regard to tonnage made is also very slight, because fuel economy and wear and tear on the furnaces demand that they be run continuously, if at all, and the capital invested in apparatus is too large to allow it to lie idle much of the time.

The waste of metal by loss and oxidation is less in the acid open-hearth process than any except the crucible process, and this is a potent factor towards economy.

## Temperature of Metal.

As regards the temperature of metal produced, both the acid and basic open-hearth processes face the difficulty that the lining of the furnace must always be heated to a higher temperature than the metal in it. There is no limit within reason to the temperature we can obtain, but at

high heats the furnace must be expected to suffer more in proportion than the metal gains.

**Fuel Economy and Time of Operation.**

The fuel economy of the acid open-hearth furnace is greater than any process except the Bessemer.

The time of operation in the acid open-hearth furnace is less than in the basic, chiefly because of its greater heat efficiency and its being more of a remelting than a purification process. It takes nearly twice as long as the crucible operation, however, and many times longer than the Bessemer.

**Length of Campaign.**

The campaign of the acid open-hearth furnace before it is necessary to cool it down for repairs is nearly 1,000 heats, as compared with 350 for the basic furnace, and 20 to 1,000 for the converters usually employed for castings.

**Operation and Installation Costs of Acid Open-Hearth Furnaces.**

The cost of installation of an acid open-hearth furnace is greater than for any but a basic furnace. A furnace of 15 to 30 tons capacity will cost from $12,500 to $30,000, depending upon layout, etc.

The cost of operation of the acid open hearth is greater than the basic process and less than the converter and the crucible. Its expense is due chiefly to the high price commanded by the low-phosphorus, low-sulphur scrap and pig iron which it requires. One disadvantage of the open-hearth process as compared to the converter is that it costs more to teem into molds one large heat of metal at long intervals than to teem several small heats almost continuously, because the latter method permits of better organization, of pouring the steel over the lip of the ladle instead of through a nozzle, and avoids the occasional hurry to get the ladle empty before the steel cools and produces skulls, defective castings, etc.

**Quality of Acid Open-Hearth Steel.**

In quality, acid open-hearth steel stands above all except crucible, but for castings, acid steel has advantages over basic that do not apply when ingots are to be made and rolled. Under comparative conditions basic steel is the most liable of all to blow holes, both because the final slag, and therefore the metal, is more highly oxidized and because the basic slag is antagonistic to getting the desired amount of silicon into the steel. Moreover, the very low point to which sulphur is occasionally reduced in the basic process is an enemy to soundness, for a moderate amount of sulphur reduces wildness. The fact that the basic heats are longer is an additional temptation to rush them unduly, thus producing overoxidation at the end with all its attendant evils. Finally, the large amount of silicon added in recarburizing for casting work produces a special danger of rephosphorization from the basic slag.

It must be observed that the acid process is also open to dangers resulting in bad quality of metal, prominent among which is that of over-oxidation during melting because there is so little reducing agent present. For the best quality of steel for structural work, engineers sometimes demand that the acid charge shall contain at least 30 or 40 per cent of pig iron, and that no oreing shall occur for at least half an hour before the steel is tapped.

Similar provisions for casting work would insure a better quality of acid castings but increase materially the cost of the process. Steel scrap in small pieces and a charge which melts cold, are conditions which increase the danger of over-oxidation.

**Characteristics of the Basic Open-Hearth Process.**

The basic open-hearth process employs a basic slag rich in lime—45 to 55 per cent including magnesia—with the consequent ability to rid the bath of phosphorus and an important amount of sulphur. The slag is large in amount, which reduces the heat efficiency of the furnace, and necessitates using a large proportion of pig in the charge, so that it shall melt easily. The slag also contains over 80 per cent of metallic oxides, including often 20 to 25 per cent of oxide of iron, so that the metal is likewise liable to be charged with oxide, lowering its quality and introducing a tendency to blow holes.

The scrap used in the basic furnace is usually only about 50 per cent of the charge, in order that there may be enough pig present to secure easy melting and furnish enough reducing agencies to prevent excessive oxidation of iron during melting.

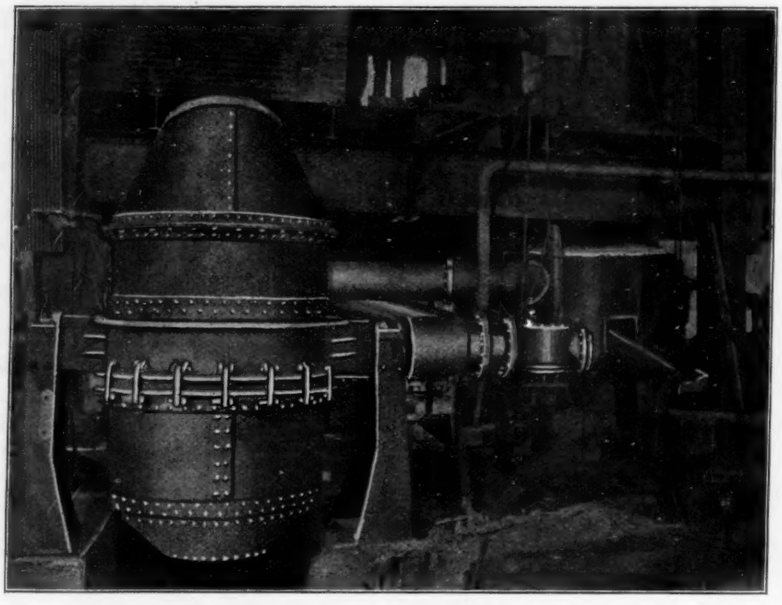

FIG. 1—STOUGHTON REMOVABLE BOTTOM CONVERTER.

Recarburization cannot take place in a basic furnace because the reducing agents added, especially silicon, will reduce phosphorus from the slag.

Even with the limited contact with the slag which exists in the ladle, the metal will contain often 0.020 per cent more phosphorus after recarburizing than before, but this condition is readily guarded against by previously reducing the phosphorus below the point determined upon as the maximum desired. It is only on those rare occasions when a violent reaction takes place between the metal and slag during recarburizing and a large amount of phosphorus is reduced that the steel is seriously affected.

The flexibility of the basic open-hearth process, both in chemical com-

position and tonnage of the product, is very slight, for the reasons given under the acid process. The flexibility in composition of product may be increased by using a tilting furnace, but these are costly to install and keep in repair.

**Loss of Weight.**

The loss of weight between metal charged and produced in the basic open-hearth process is greater than that of the acid process, but is only one-third to one-fifth of the converter process. It is to be observed, however, that when very low figures for waste are obtained in the basic process, it is by means of excessive oreing, or of too much steel scrap in the charge, both of which have the effect of lowering the quality of the castings by over-oxidation.

**Temperature of Basic Open-Hearth Steel.**

The temperature of basic steel is sufficient for all castings over 100 pounds in weight, and even smaller, if there are not too many of them to be poured at the same time, because then the length of time required for teeming makes the metal cool towards the end with the dangers of stopper troubles, misruns, etc. Small-sized heats would solve this difficulty, but even then the furnace will suffer from the high temperature to which it is heated, and open-hearth furnaces of less than 15 tons capacity are costly to operate per ton of product on account of their proportionately higher charges for labor in operation and repairs, their lower heat efficiency and their increased fixed charges ter ton, these including interest on investment, superintendence, etc. It has been well contended that a shorter furnace will suffer less from expansion and contraction, but, as it is not good practice to cool down the furnace any oftener than is necessary, and as fuel economy and length of campaign, especially life of ports and roof, are also directly dependent upon the length of the working chamber, the latter factor will always far outweigh the former. One has only to observe the recent fuel economies obtained by increasing the capacities of ingot furnaces to 70 and 75 tons, and the readiness with which steel makers have adopted this change, to emphasize this condition as much as it merits it. Excellent quality of steel castings can with due care and skill be made in these small furnaces, and this circumstance deserves attention.

**Heat Efficiency of Basic Open-Hearth.**

The heat efficiency of the basic furnace is the lowest of all those used for steel making, chiefly because the heat must penetrate a very bulky slag with low heat-conducting power in order to reach the metal. The more impure the metal used for purification, the greater will be the bulk of the slag necessary, although this circumstance is somewhat compensated for by the greater ease with which the metal melts, but the impure metal also requires a longer time for conversion, with the consequence of more fuel burned, so that there is a loss

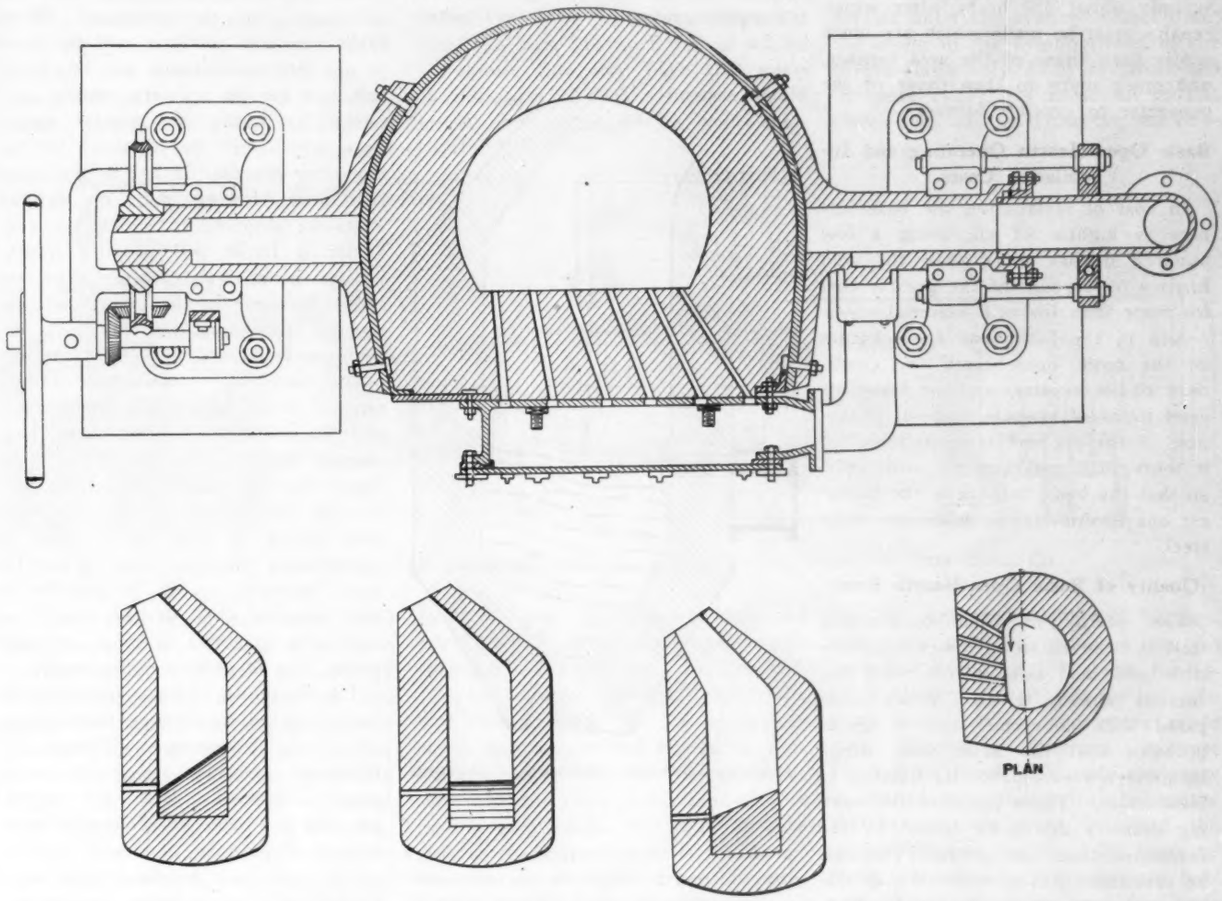


FIG. 2—PLAN AND SECTIONS OF THE ROBERTS-BESSEMER CONVERTER.

both in fuel and labor charges.

**Length of Basic Open-Hearth Campaign.**

The basic open-hearth operation is also the longest of all, averaging perhaps an hour or so longer per heat than the acid process. This makes labor and fuel charges per ton high, and is the cause of the flexibility of the production being slight, when compared to the converter and crucible processes.

The campaign of the basic furnace is only about 350 heats, after which repairs must be made which are more costly than those of the acid furnace, and much more so than those of the converter or crucible furnace.

**Basic Open-Hearth Operating and Installation Costs.**

In cost of installation the basic furnace is highest of all, being a few hundred dollars more than the acid furnace on account of the greater cost for basic than for acid material.

Add to the labor and fuel charges of the basic open-hearth the costliness of its repairs, and we have its chief items of expense, but the cheapness of the pig and scrap suitable for it more than make up the difference, so that the basic furnace is the cheapest one in America in which to make steel.

**Quality of Basic Open-Hearth Steel.**

The quality of basic open-hearth steel is believed to be lower than crucible and acid open-hearth steel, for reasons already given. When compared with converter steel it seems probable that the basic steel would be preferred except for its liability to blow holes. These pests of the casting industry are more feared by the consumer than the producer because he sometimes has to spend money machining the castings before he finds them defective, and this represents a financial loss to him in addition to the delay before castings can be made to replace them. In actual tests, the basic and converter steels run very close together, although it is possible to produce castings extra low in phosphorus by the basic process when this is a consideration, and therefore more durable under shock tests, although this is seldom, if ever, applied so far as we know.

**Characteristics of the Converter Process.**

The distinguishing features of the converter process are:

An acid slag with the consequent inability to purify the metal from phosphorus or sulphur and the resulting necessity of purchasing pig iron low in these two elements, and therefore higher in price. The amount of the slag is only about 10 or 11 per cent of the weight of the bath and it is even more tenacious of oxygen than the acid open-hearth slag, because lower in metallic oxides. In this respect the metal is well protected from over-oxidation, but this is more than overbalanced by the rapidity of the conversion and the strongly oxidizing conditions which

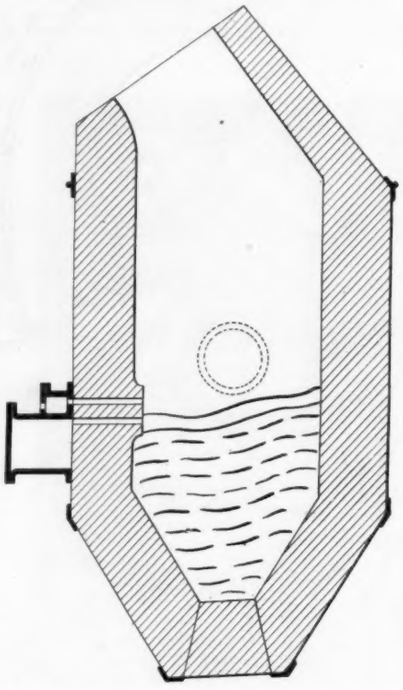

FIG. 3—TROPENAS BESSEMER CONVERTER.

produce it. In short, there is more iron burned to oxide in the converter process than in any of the others, but no iron oxide is added to the slag from extraneous sources as in both of the modifications of the open-hearth process.

The converter uses a relatively small amount of steel scrap—say 25 per cent or so—being merely what can be melted with the iron in the cupola.

Recarburization may take place in the converter and this is a source of slight saving since there is a notable reduction of iron from the slag thereby. It also insures a more perfect mixing and distribution of carbon and silicon.

**Flexibility of the Converter.**

The flexibility of the converter process in the composition of steel produced is greater than that of any of the other processes. This requires no explanation in relation to the open-hearth processes since the smaller size of the converter heats and the circumstance that metal can be taken out of the converter in lots of 50 pounds or more, each dosed separately, gives it undoubted advantages. As compared to crucible metal its relative flexibility depends upon the circumstance that the amount of carbon in crucible steel is controlled partly by chance and is liable to vary from the intentions of the manager. With great care the analysis will be close to pre-determined limits and this quite sufficient for all ordinary casting purposes, but lacks the regular exactness which can be obtained in the converter process. It has been claimed that poor blowing, poor dosing and excessive slopping to which the converter is liable will produce irregularities in analysis greater than are liable to occur in the open-hearth or crucible processes, but my own experience leads me to believe the opposite, and that irregularities due to any of these causes are unnecessary and uncommon. It has also been claimed by the advocates of the open-hearth process that it is not possible to stop the converter and take samples during a blow as is usual in open-hearth practice. Such is not the case, however, as it is possible to take samples when desired and is occasionally practiced in most converter plants, but is usually unnecessary.

The flexibility of the converter process in regard to tonnage made is one of its chief advantages, although here it cannot claim any superiority to the crucible process. Not only may a two-ton converter be economically operated to produce anywhere from 10 to 60 tons in a working day, but it may lie idle every other day, or even longer, with only slight additional cost, since the capital invested is small in amount and the skill required for superintendence, blowing, etc., is not so great but that it may be acquired in a short time by the foundry chemist or some other employe who when the converter is not operating will be advantageously employed in some other way, and the labor of repairing does not require a special man but can be performed by an ordinary molder's helper properly supervised. It is not necessary to keep the converter hot between its periods of operation as is the case with the open-hearth furnace, because the converter suffers no material damage in cooling

and heating and it can be pre-heated for the first "blow" with a small amount of wood and coal. One great advantage of flexibility in production aside from allowing for fluctuations in demand is the ability occasionally to make a few extra castings at short notice to oblige a customer or to replace defective castings with minimum delay. The average time between heats will be 20 to 25 minutes and it is possible to make from 25 to 30 heats in 10 hours, if desired.

**Wastes in Converter.**

The waste of metal in the converter process is its greatest disadvantage and source of expense as compared with all the other processes. The fact that in its early years tear on the furnace than is the case in the open-hearth process, for the reason that the converter metal is made hotter than the furnace, while the open-hearth furnace is always hotter than the metal in it. It is said that this is one of the chief reasons why converter metal is especially adapted for the manufacturer of small castings, and also for its lesser liability to blow holes, but there does not seem to be any good reason why metal made in a small open-hearth furnace, say of five tons capacity, should not be equally suitable for light castings, provided one is willing to endure the very high fuel costs that the use of such a furnace would entail on account of its poor combustion and the short life of ports which a short, open-hearth furnace always has to endure. It has been argued that the high temperature of the converter metal is a danger and source of "hot cracks" and defective castings, because of incorrect judgment of the casting temperature, but it is no more difficult to judge the temperature of the steel in the ladle from the converter than to judge the temperature of the flame in the open-hearth furnace.

conversion enables large sized castings to be made occasionally, although the converter process is not suited to making regularly single castings whose weight is greater than the capacity of the furnace. Nevertheless it is not unusual to make four-ton castings with one two-ton converter, saving the metal from the first blow until that from a second blow is ready and six-ton castings are sometimes made with the same apparatus.

**Length of a Converter Campaign.**

The campaign of the converter will depend upon the type of vessel used; the lining in the neighborhood of the tuyeres lasts only 20 to 25 blows and in those converters made all in one piece—such as the Tropenas, the Robert, the Zenzes, etc.—it will be necessary to put the converter out of commission and cool it down for repairs at the end of this period. In those steel casting converters made with removable bottoms, however (Stoughton type), it is only necessary to change to a new bottom whenever the tuyeres are worn out and the upper part will last for 1,000 heats or more. Moreover, the removable bottom greatly cheapens and facilitates repairs, because those converters made all in one piece require a great hole to be cut in the lining of the side, in order to get at the part to be repaired, so that one removable bottom converter with one spare bottom has a daily capacity almost equal to three converters of the same size built all in one piece.

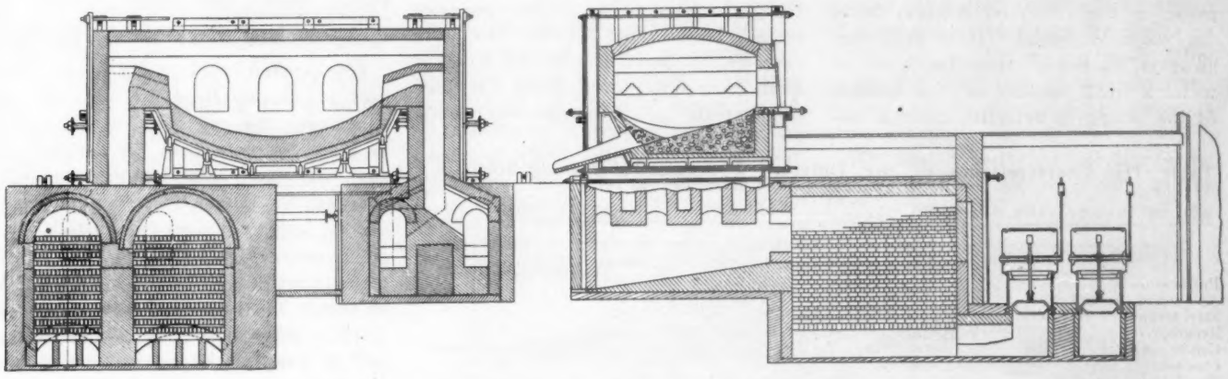

FIG. 4—FIFTEEN-TON SIEMENS OPEN-HEARTH FURNACE AT PLANT OF OTIS STEEL CO.

in this country inexperienced and careless practice made the loss often as high as 25 or 30 per cent, caused rather exaggerated accounts of this feature to be spread, but it is quite possible to operate any of the smaller converters with a waste not exceeding 20 per cent of the weight of metal charged into the cupola. I have operated a converter continuously for some months with a waste not exceeding 15 per cent between the weight of the metal charged in the cupola and that of the molten steel in the ladle, nor is this practice a personal factor, as others have done the same thing for a period of five years. This requires, however, an amount of attention to detail which has not always been given to the converter process for the reason that those who operated it formerly were usually either not educated in this country and did not see the necessity of due attention to this particular or else were persons who had not been trained in steel making.

It is possible to get a higher temperature in the converter method with less cost for repairs and less wear and

The fuel used in the converter operation is the impurities in the metal and all that is required in addition is that for melting in the cupola and for heating the converter and ladles once each day.

**Time of Converter Operation.**

The time of the Bessemer operation is about 14 minutes to which must be added that necessary for pouring the steel into ladles and pouring in a new charge. As it is customary in some shops to take the whole of the steel in hand ladles, there will be in such a case quite a delay between the operations. The short time of the

**Cost of Converter Installation.**

The cost of installation of a converter with accessory apparatus will be less than that of an open-hearth furnace of equal capacity. How much less will depend upon the type of converter. For example one must have at least three two-ton converters built all in one piece to equal in

capacity one 15-ton open-hearth furnace.

The cost of these converters would be:

| | |
|---|---|
| Converters and lining | $5,000 |
| Blower with motor | 2,000 |
| Cupolas and linings | 950 |
| | $7,950 |

One two-ton converter with one spare interchangeable bottom would have almost as great a capacity and the cost would be:

| | |
|---|---|
| Converter and lining | $1,650 |
| Spare bottom | 375 |
| Blower with motor | 2,000 |
| Cupolas and linings | 950 |
| | $4,975 |

**Cost of Converter Operation.**

The cost of operation of the converter process is less than any except the basic open-hearth, for reasons already outlined, the chief item of expense in the converter process being the waste of metal. It is only fair, however, to deduct from the waste of metal a small amount in consideration of the saving in defective castings due to the freedom from blow holes in which respect the converter has a decided advantage over the basic open-hearth, and, to a less extent, over the acid open-hearth also. In making light castings there will also be a further saving by the converter process due to a smaller number of misruns and skulls.

**Quality of Converter Steel.**

The quality of converter steel is about on a par with that of basic open-hearth steel. It will be higher in phosphorus, unless only the very purest metal is used for charges, but it will, however, have the advantage of being higher in silicon, and much less liable to blow holes. This latter feature is due partly to the higher silicon, but is no doubt increased by the high temperature of the converter metal, because it exceeds the acid open-hearth steel also in its freedom from blow holes. No doubt, the high temperature of the converter metal assists in freeing it from its dissolved gases, and also from oxide of iron which is an important cause of blow holes, it being a theory maintained by several that the hotter the steel the more readily will the oxide of iron separate itself from its state of suspension in the bath. The fact that the converter metal is usually poured over the lip of the ladle assists in freeing the metal from gas and producing soundness and also lessens the size of gates required.

There are more than 15 steel casting plants using a total of more than 25 Tropenas converters; three plants, with a total of five converters of the removable bottom type, and from one to three converters each of the Bookwalter, Robert Clapp-Griffiths, Wills, Fisher, Zenzes and other types.

**Characteristics of the Crucible Process.**

The crucible process for steel castings is characterized by the use of expensive raw material which costs as much or more than the product of any of the other processes—high charges for crucibles, labor and fuel and a very low cost of installation, being only a few hundred dollars for the erection of a coal-fired crucible furnace. The quality of the crucible steel is higher than that of the product of any of the other processes—chiefly on the account of the protection of the metal from oxidation and contamination by fuel, as well as because of the small units in which the steel is made and the consequent necessity for care and attention.

**Table III—Characteristics of the Different Processes of Making Steel for Castings.**

| | Acid Open-Hearth | Basic Open-Hearth | Converter | Crucible |
|---|---|---|---|---|
| Purification is | Acid | Basic | Acid | ..... |
| Amount of slag, per cent | 6 to 15 | 15 to 30 | 10 to 11 | ..... |
| Steel scrap used, per cent | 85 | 50 | 25 | ..... |
| Recarburize | In furnace | In ladle | In furnace | ..... |
| Can be operated | Continuously | Continuously | Intermittently | Intermittently |
| Flexibility in analysis | Small | Small | Great | Great |
| Flexibility in composition | Small | Small | Great | Small |
| Metal loss, per cent | 3 | 5 | 15 to 30 | 1 to 2 |
| Metal or furnace, hotter? | Furnace | Furnace | Metal | Furnace |
| Fuel used, per cent | 25 | 30 | 15 | 125 |
| Time of conversion | 7 hours | 8 hours | 20 minutes | 4 hours |
| Campaign in heats | 1,000 | 350 | 20 to 1,000 | Several thousand |
| Cost of installation | Large | Largest | Small | Smallest |
| Cost of operation | Medium | Smallest | Small | Largest |
| Danger of blow holes | Medium | Greatest | Small | Least |
| Quality of castings | Second | Lower | Lower | Best |

# AN INSERTED BLADE MILLING CUTTER FOR HIGH POWER MACHINES[1]

By Wilfred Lewis and Wm. H. Taylor.[2]

It has long been recognized that the process of milling is superior to any other for machining metal because the metal can be removed at a much higher rate of speed than by any other method, and as the operation of cutting is continuous, milling cutters being made up of a multiplicity of cutting edges, work can be machined at a much lower time cost. After the advent of high speed steel, builders of milling machines, especially those of the planer type, began to offer high-powered milling machines, and today it is a very common thing to see a milling machine whose spindle is driven by an individual motor of from 50 to 75 horsepower capacity, whose platen is driven by an independent motor of from 7 to 15 horsepower capacity and whose cross-rail is raised and lowered by an individual motor of from 3 to 5 horsepower capacity. While the milling machine has been developed to high power and high speed, the milling cutter has not advanced as rapidly; the user is thus confronted with a very unsatisfactory condition, the output of his milling machine being limited to cutters of inadequate capacity. This condition results from faults of design lying in the shape of the blade and method of fastening. This criticism applies to the inserted blade type of cutter, which by reason of its cheapness in first cost and maintenance has been universally adopted for heavy slab milling.

In 1892 George Brechtol developed a milling cutter of the inserted-blade type, in which the blades were made of carbon steel, properly shaped and secured. The results obtained at the time were considered extraordinary, being far in advance of those obtained by other types of carbon steel cutters. His cutter consisted of a malleable iron core, bored and keyseated, into whose body were planed eight helical dove-tailed grooves, considerably wider than the blades. The blades were

[1] A paper presented at the New York meeting (December, 1908) of the American Society of Mechanical Engineers.

[2] Tabor Mfg. Co., Philadelphia.

bent around a cylinder to the desired helix. They were set inside a cylinder and properly spaced by means of blocks; the core was then set in position and soft metal poured, filling the

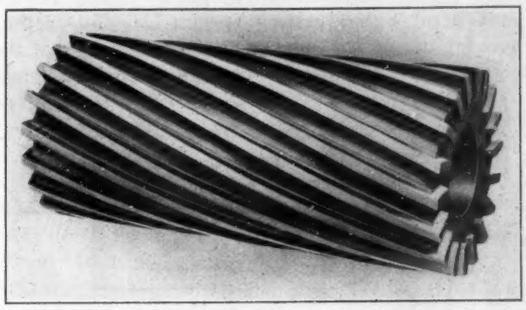

FIG. 1—HIGH SPEED INSERTED STEEL HELICAL BLADE MILLING CUTTER. EIGHT INCHES DIAMETER, 3½ INCHES BORE, 18 BLADES.

dove-tail grooves and the spaces between the blades.

C. D. Peck was the first to develop successfully a milling cutter of the inserted-blade type for heavy slab milling, having high speed steel blades, helical in shape. The paramount feature in Mr. Peck's cutter was the helical shape of the blades. He planed helical slots, rectangular in shape, in a steel housing, inserted therein high-speed steel blades bent to fit the helix of the slot, and held them in a rigid position by means of wedges inserted at intervals between the front face of the blades and the side of the slot, filling the spaces between the wedges with soft metal. Mr. Peck designed and built a hand press for bending the blades, which consisted of a pair of lat-

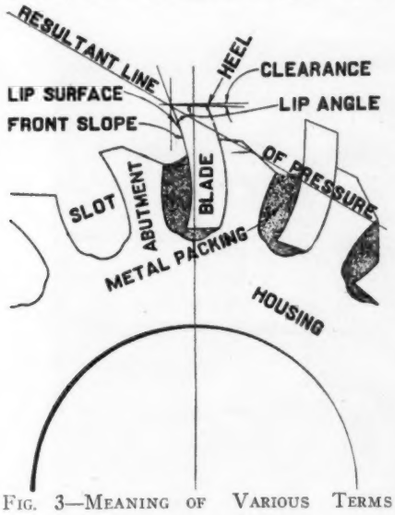


FIG. 3—MEANING OF VARIOUS TERMS APPLIED TO CUTTER.

eral jaws encircling a shaft; one of them stationary, the other actuated by a lever and toggles so as to close upon the blade to form a helix.

His first cutter was built at the Pittsburg Works of the American Locomotive Company in 1905, and from tests made at the time, the results were far in excess of those obtained from other types of milling cutters with inserted blades, both in material removed in a specified time and in power consumed per cubic inch of material removed. He proceeded to build more cutters and put them into use, having conclusively demonstrated by continuous operation that the capacity of these cutters for removing metal was not only far greater than that of other types of inserted blade cutters, but in excess of the capacity of the modern type of high-powered milling machine.

Early in 1907 Mr. Peck had a conference with the manufacturers of the Taylor-Newbold cold saw, who were developing a milling cutter of the inserted-blade type, and the conference resulted in Mr. Peck turning his developments over to the Taylor-Newbold people. It was from this combination that the milling cutter about to be described was evolved. See Fig. 1.

Our primary investigations showed that there was no existing standard, or suitable rule, governing the construction of milling cutters with inserted blades, nor was there any record of exhaustive tests made to determine the most effective pitch, proper clearance angles, or front slope and lip angles to be employed, and judging from past and present constructions in milling cutters of the inserted-blade type, the functional elements are merely arbitrary selections to suit individual tastes.

We also found the prevailing practice in constructing milling cutters with inserted blades to consist of cutting rectangular slots in a cylindrical housing, the slots lying in a plane angular to the axis. The angle from the axis at which the plane is set varies from 5 to 25 degrees according to the length and diameter of the housing. The blades are straight pieces of high speed steel, which are ground off after being inserted in the slots until a definite projection from the housing along the cutting edge is attained, after which clearance is obtained by "backing off." The blades are held in position by various methods, such as clamps placed between each alternate pair of blades and drawn inward by screws; or by cutting grooves in the abutment between each alternate pair of blades and forcing the parted abutments by means of taper screws to clamp the blades on either side; or by driving wedges between the front face of the blade and the side of the slot; and by numerous other means.

We also found that much can be learned and applied to milling cutter blades from the development of the

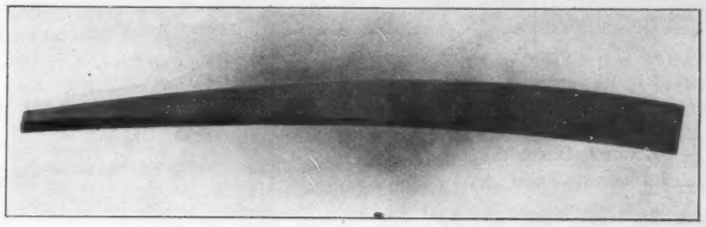

FIG. 2—HIGH SPEED STEEL BLADE, BENT TO HELICAL SHAPE, AND HARDENED BY TAYLOR-WHITE PROCESS BEFORE INSERTION IN HOUSING.

lathe and tool, especially the round nose tool; a fact totally ignored by the manufacturers of milling cutters, who still try to accomplish the impossible, —that is, setting a straight blade in a slot with its front face in a plane angular to an axis, to develop thereby and maintain throughout its length the

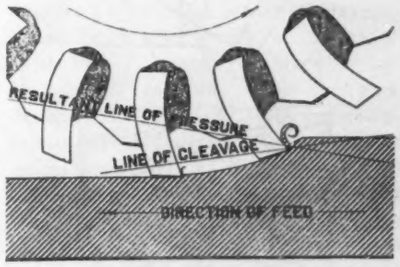


FIG. 4—ACTION OF TOOTH ON CHIP.

proper front slope and lip angle, and define a helix on the line of the cutting edge.

The first point which we considered in constructing the cutter to be described was the shape of the blade, with

the following conclusions. To maintain a prescribed slope and lip angle throughout its entire length, the blade must be bent to form a helix, and by so shaping it all angles and the contour of both blades and slot would be constant over their entire lengths. Again, with the blades helical in shape, a continuous cutting edge with a constant lip angle would be maintained throughout any length of cutter.

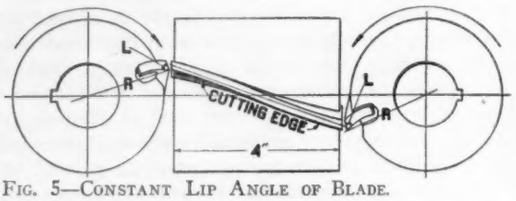


FIG. 5—CONSTANT LIP ANGLE OF BLADE.

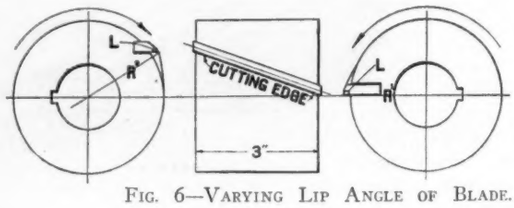


FIG. 6—VARYING LIP ANGLE OF BLADE.

The second point for consideration was the pitch or lead of the blade, and from experiments with various leads we found an effective angle for the helix to be about 20 degrees. To facilitate computation, we adopted the formula (diameter × 9) = pitch, which would develop 19 degrees, 15 minutes as the angle of the helix.

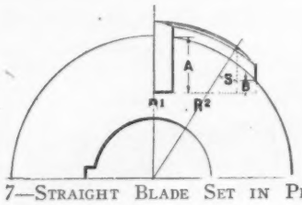


FIG. 7—STRAIGHT BLADE SET IN PLANE RADIATING FROM AXIS.

The third point was the form of the grooves in the cutter blank. These had previously been planed approximately rectangular in section with a slight amount of undercutting to hold the blade and the wedges used for fastening it in place. It occurred to one of us however that this grooving of the cutter blank could be done better and faster by milling than by planing, and that an undercut groove might be produced at once by a saw set in a certain relation to the cutter blank. This suggestion was soon proved practicable, and although the groove so formed was not so easily fitted with a cutter blade on account of its curved sides, the curved sides gave the cutter a lip angle which was of great value in actual service. To form the blades accurately to the shape of the groove, it was necessary to design a bending machine of great power, capable of squeezing the blades at once to proper form not only as helices of correct pitch, but of correct curvature in a direction normal to the helix. See Fig. 2.

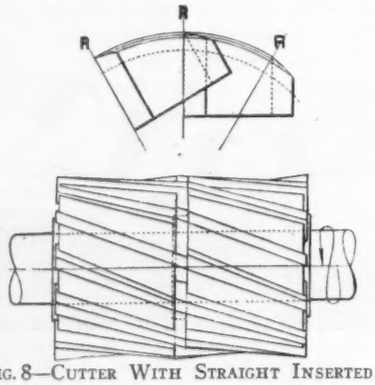


FIG. 8—CUTTER WITH STRAIGHT INSERTED BLADES MADE UP IN SECTIONS.

This machine was made to act in one way like the original hand-bending machine made by Mr. Peck, but in addition to the lateral jaws which closed on the blade to form the helix it was provided with a cap which snapped quickly upon the lateral jaws, completely enclosing the blade being bent to proper form. Time is such an important element in the handling of high-speed steel that the value of this bending machine, which was quick enough to act before the temperature of the steel had fallen below the working point, can hardly be over-estimated.

The fourth point for consideration was the method of securing the blades. Mr. Peck's experiments showed metal wedges to be neither satisfactory or economical as a means of securing the blades. While installed with ease they were exceptionally hard to remove when necessary to replace blades, owing to their tend-

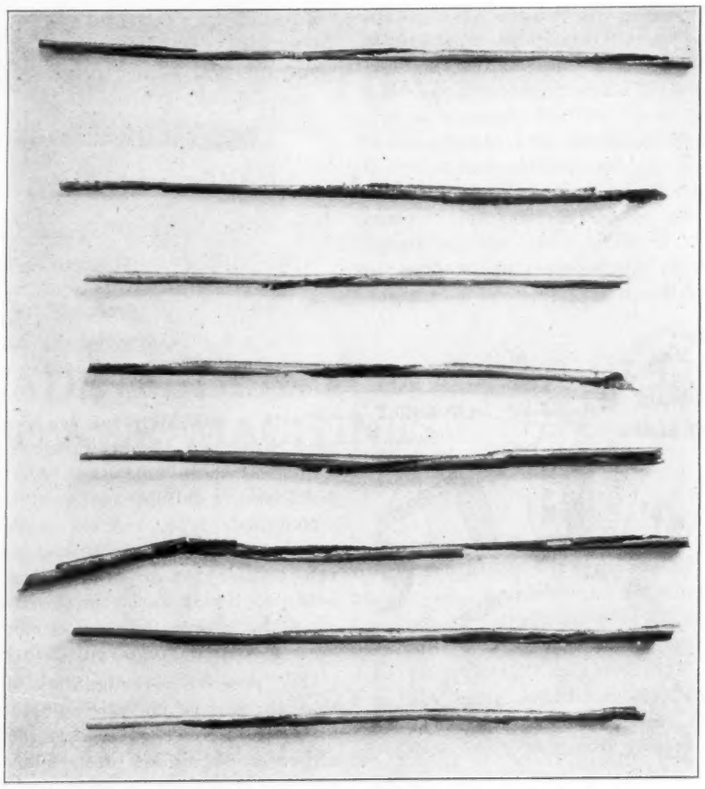

FIG. 9—STEEL CHIPS MILLED FROM 0.57 PER CENT CARBON STEEL FORGING, 18 INCHES WIDE AT THE RATE OF 47¼ CUBIC INCHES PER MINUTE.
These chips varied from 14 to 16½ inches in length.

ency to imbed themselves in the housing. Furthermore, by driving them in at intervals along the high speed steel blade intermittent strains were developed, causing the blade to crack and spall off at the point of contact between the wedge and blade when under cutting pressure. Other mechanical fastenings were debarred either by excessive cost or by inability to withstand vibration and remain rigid.

Experiments were made with various alloys until a proper combination was obtained, capable of flowing freely, cooling without shrinkage, withstanding great strains without crumbling and being removed quickly and economically. A device was designed for compressing the alloy in the slots after it had been poured, and a device for removing the alloy when replacement of blades is necessary. With the alloy compressed in the slots we are able to secure the blades in an anchorage sufficiently rigid so that the blades may be broken off by sheer force without affecting it.

The milling cutter in question will be referred to here as a "Helical" rather than a "Spiral" cutter. Fig. 3 shows the meaning of the following terms: housing—body of cutter; abutment—support of blade; metal packing—anchorage; slot; blade; heel of blade; clearance angle; lip angle; front slope; lip surface, and resultant line of pressure. The side slope is defined by the angle of the helix.

Fig. 4 shows how the chip is partly torn and partly sheared from the body of the forging, the cutting edge of the blade not being under heavy pressure. Our experiments have shown conclusively that the closer the center of pressure of the chip is to the cutting edge, the greater its intensity, and the generated heat is largely concentrated towards the cutting edge, where the sectional area to carry it off is much less. Then again the frictional heat generated by the lack of back slope becomes so great as to cause cohesion between the chip and the cutting edge. To eliminate this condition where straight blades are employed, the practice is to set the front face of the blade slightly back of a radial plane (see line R, Fig. 5), to assure a front slope. It is well

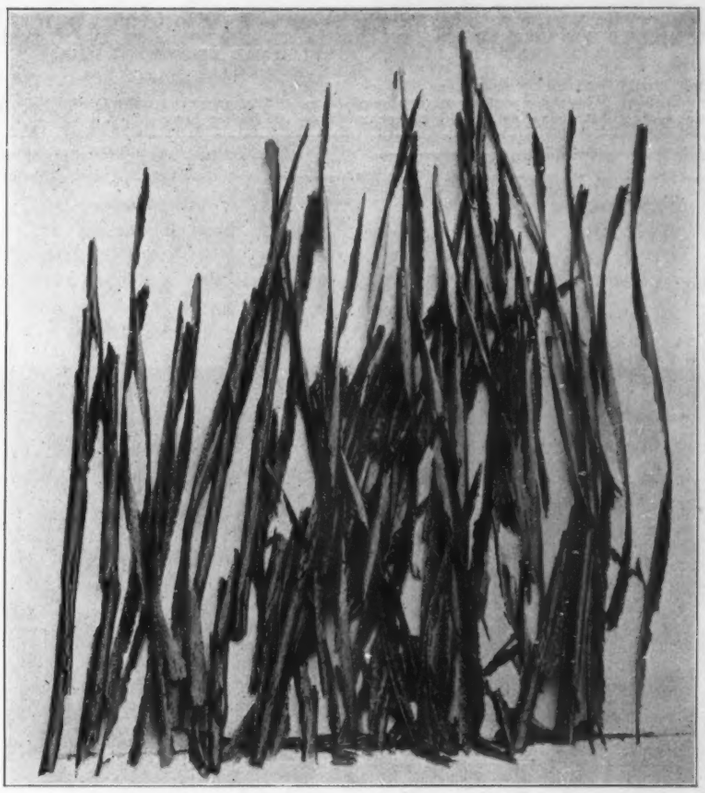

FIG. 10—CAST IRON CHIPS MILLED FROM A SURFACE 14 INCHES WIDE.

These chips were removed at the rate of 145 cubic inches per minute, and as a whole are straight and cylindrical in shape. They average about 12 inches long, and are strong enough to support themselves when standing on end.

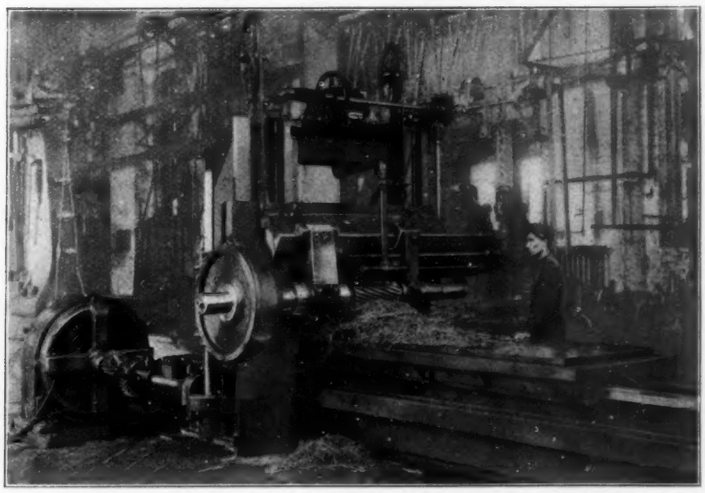

FIG. 11—BEMENT-MILES HIGH POWER MILLING MACHINE.

Fig. 5 shows a constant lip angle L throughout the entire length of the blade, which is set at an angle of 20 degrees to an axial plane, this angle remaining constant throughout any length by reason of the blade's curvature. Fig. 6 shows a varying lip angle L from maximum at line R1 to minimum at line R2 in a straight blade set at an angle of 20 degrees to an axial plane. This condition limits the length of blades.

In Fig. 7 a straight blade is set in a plane radiating from the axis, designated by line R1, and by carrying it across the face of the housing at an angle set at 20 degrees to an axial plane. It may be observed that the development is from no front slope to a positive front slope, designated by the letter S. In milling, a blade with this irregularity in front slope causes the cutter to drag on one side and gouge on the other. Blades of this type cause excessive vibration to the cutter, due to the varying angle of the front slope, and necessarily consume more power.

### Table I—Slab Milling Cast Iron.

TAYLOR-NEWBOLD HIGH-SPEED STEEL MILLING CUTTER, 8-IN. DIAMETER, 18-IN. FACE, 18 INSERTED BLADES. TEST MADE AT BEMENT-MILES WORKS, JULY 13, 1908.

Machine Used: 42-Inch Bement-Miles Milling Machine.
Driving Motor: Direct-Current Constant Speed Type 40-Horsepower at 220 Volts, 153 Amperes.
Material Cut: Cast Iron Test Block, 15 Inches Wide, 36 Inches Long.

| | Cut: Feed | | | Cut: Material Removed | | | | | Speed of Cutter | | Electrical Readings: Driving Motor | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of test. | Table advance per minute, inches. | Advance per blade, inches. | Depth, inches. | Width, inches. | Cubic inches per minute. | Pounds per minute. | Pounds per hour. | Duration of test. | Revolutions per minute. | Feet per minute. | Amperes. | Volts. | Horsepower. | Horsepower per cubic inch removed. |
| 1 | 3½ | .00636 | ½ | 15 | 26.25 | 6.83 | 410.13 | 10m. 2s. | 25 | 53½ | 150 | 200 | 40.21 | .53 |
| 2 | 5⅓ | .01332 | ½ | 15 | 44.06 | 11.47 | 688.38 | 6m. 8s. | 24½ | 51⅓ | 150 | 220 | 44.23 | 1.00 |
| 3 | 7½ | .01736 | ½ | 15 | 56.25 | 14.74 | 737.33 | 4m. 48s. | 24 | 50¼ | 160 | 208 | 44.70 | 0.794 |
| 4 | 6⅓ | .01361 | ½ | 15 | 45.93 | 11.96 | 717.72 | 5m. 5s. | 25 | 53½ | 175 | 208 | 48.79 | 1.060 |
| 5 | 7¾ | .01722 | ½ | 15 | 58.12 | 15.13 | 908.14 | 4m. 39s. | 25 | 53½ | 225 | 200 | 60.32 | 1.030 |
| 6 | 7¾ | .01781 | ½ | 15 | 50.70 | 13.20 | 792.13 | 4m. 53s. | 23 | 48 | 260 | 204 | 70.96 | 1.390 |
| 7 | 7⅓ | .01781 | ½ | 15 | 50.70 | 13.20 | 792.13 | 3m. 39s. | 23 | 48 | ... | ... | ..... | ..... |
| 8 | 8 | .01851 | ½ | 15 | 82.50 | 21.48 | 1288.98 | 1m. 15s. | 24 | 50¼ | 240 | 213 | 68.52 | .830 |
| 9 | 7 | .01760 | 1 | 15 | 105.00 | 27.34 | 1640.52 | 3m. 17s. | 22 | 47 | 350 | 190 | 89.14 | .849 |

### Table II—Slab Milling Steel.

TAYLOR-NEWBOLD HIGH-SPEED STEEL MILLING CUTTER, 8-IN. DIAMETER, 18-IN. FACE, 18 INSERTED BLADES. TEST MADE AT BEMENT-MILES WORKS, JULY 14, 1908.

Machine Used: 42-Inch Bement-Miles Milling Machine.
Driving Motor: Direct-Current Constant Speed Type 40-Horsepower at 220 Volts, 153 Amperes.
Material Cut: 30 Per Cent Carbon Steel Test Block, 18 Inches Wide, 20 Inches Long.

| | Cut: Feed | | | Cut: Material Removed | | | | | Speed of Cutter | | Electrical Readings: Driving Motor | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of test. | Table advance per minute, inches. | Advance per blade, inches. | Depth, inches. | Width, inches. | Cubic inches per minute. | Pounds per minute. | Pounds per hour. | Duration of test. | Revolutions per minute. | Feet per minute. | Amperes. | Volts. | Horsepower. | Horsepower per cubic inch removed. |
| 1 | 11¼ | .01785 | 5/16 | 18 | 31.64 | 8.96 | 537.81 | 1m. 47s. | 35 | 73⅓ | 190 | 220 | 56.03 | 1.77 |
| 2 | 11¼ | .01785 | 5/16 | 18 | 63.28 | 17.92 | 1075.62 | 0m. 11s. | 35 | 73⅓ | ... | ... | ..... | .... |
| 3 | 6⅓ | .01041 | 3/16 | 18 | 43.03 | 12.19 | 731.44 | 1m. 30s. | 34 | 71 | 300 | 195 | 78.41 | 1.82 |
| 4 | 7 | .01080 | 3/16 | 18 | 47.25 | 13.38 | 801.15 | 1m. 26s. | 36 | 75½ | 400+ | 180 | 96.51 | 2.04 |
| 5 | 7 | .00925 | 3/16 | 18 | 47.25 | 13.38 | 801.15 | 2m. 51s. | 42 | 88 | 370 | 187 | 92.74 | 1.96 |

### Table III—Milling Channels.

TAYLOR-NEWBOLD HIGH-SPEED STEEL MILLING CUTTER, 4⅛-IN. FACE, 8-IN. LISTED DIAMETER, 8½-IN. ACTUAL DIAMETER, 18-IN. INSERTED BLADES, 3½-IN. BORE. TEST MADE AT BEMENT-MILES WORKS, OCTOBER 20, 1908.

Machine Used: 42-Inch Bement-Miles Milling Machine.
Driving Motor: Direct-Current Constant Speed Type 40-Horsepower at 220 Volts, 153 Amperes.
Material Cut: 35 Per Cent Carbon Steel Forging.

| | Cut: Feed | | | Cut: Material Removed | | | | | Speed of Cutter | | Electrical Readings: Driving Motor | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of test. | Table advance per minute, inches. | Advance per blade, inches. | Depth, inches. | Width, inches. | Cubic inches per minute. | Pounds per minute. | Pounds per hour. | Duration of test. | Revolutions per minute. | Feet per minute. | Amperes. | Volts. | Horsepower. | Horsepower per cubic inch removed. |
| 1 | ... | ..... | ... | ... | ..... | .... | ..... | .... .... | 39 | 82.95 | 35 | 220 | 10.32 | .... |
| 2 | 6⅛ | .01320 | 1/16 | 4⅛ | 9.40 | 2.66 | 159.78 | 3m. 25s. | 37 | 78.69 | 85 | 200 | 22.74 | 2.42 |
| 3 | 1⅛ | .00307 | 1 | 4⅛ | 8.48 | 2.40 | 144.14 | 7m. 12s. | 35 | 74.44 | 95 | 185 | 23.56 | 2.77 |
| 4 | 1½ | .00231 | 1 | 4⅛ | 6.56 | 1.86 | 111.51 | 4m. | 36 | 76.57 | 85 | 193 | 21.85 | 3.33 |
| 5 | 2⅝ | .00394 | 1 1/16 | 4⅛ | 15.07 | 4.27 | 256.15 | 2m. 40s. | 37 | 78.69 | 113 | 200 | 30.29 | 2.00 |
| 6 | 3⅜ | .00544 | 1 1/16 | 4⅛ | 20.81 | 5.89 | 353.72 | 1m. 56s. | 37 | 78.69 | 135 | 195 | 35.28 | 1.69 |
| 7 | 5 | .00750 | 1 1/16 | 4⅛ | 28.71 | 8.13 | 488.01 | 1m. 24s. | 37 | 78.69 | 200 | 190 | 50.93 | 1.77 |

It is also a fact that when a rectangular slot is cut in the face of a housing at an angle of 20 degrees to an axial plane, its depth becomes gradually less as it progresses across the face, until it reaches a vanishing point designated by lines A and B in Fig. 7. This condition not only limits the width of the cutter and necessitates a housing of large diameter when a medium width of cutter is required, but develops an anchorage possessing the required strength and rigidity at one side and decreasing in proportion to the length of blades at the other.

Fig. 8 illustrates a cutter with straight inserted blades made up in sections, each alternate blade overlapping the blades in the opposite section, so as to obtain the desired width of face. The sections are so set that the cutting edge forms a continuous line. Above the cutter is a diagram showing the relation of the blades in one section to those in the other.

Too much stress cannot be laid on the use of a lubricant during the process of milling. A copious stream of lubricant falling at slow velocity should be thrown directly upon the chip at the point of removal. Heat generated by the pressure of the chip is the chief cause for wear, and if allowed to become too great it will soften the lip surface of the blades and cause them to crumble or spall off. An ample supply of lubricant during the milling operation carries off the heat, materially lessening the dulling of the cutting edges.

From our experiments and those of others it has been conclusively shown that a gain of 33 per cent in the cutting speed in milling steel and wrought iron is made by throwing a heavy stream of lubricant upon the cutter and along its entire face; and a gain of 15 per cent in milling cast iron. The piping for conveying the lubricant to the milling cutter should be arranged with nozzles spaced about 4 inches apart, in sufficient number to cover the face of the cutter. The main supply pipe to the nozzles should be large enough to supply each nozzle with from two to three gallons of lubricant per minute.

In the tabulated tests the amount of power consumed by the milling machine will be given as read from the voltmeter and ammeter. Dynamometer readings of the actual power exerted at the spindle, or the power consumed by friction in the gearings and bearings, will not be given consideration.

# A PLATE SHOP EQUIPPED FOR HEAVY WORK

There has recently been completed at Niles, O., the plant of the Standard Boiler & Plate Iron Co., which was laid out with a special reference to handling all kinds of plate work of the heaviest character. While the machinery which has been installed in it is largely of standard type, it has been made unusually massive in order to take plates of extra thickness and large size. The transportation facilities, which are unusually complete, have been designed to facilitate the rapid handling of work through the plant, with resulting economy in the filling of contracts.

The main building is 200 feet in length by 124 feet wide. It is divided into three bays, those on the side having an approximate width of 33 feet. One side is used for the shearing, bending and punching machinery, and the opposite side for all forging work. The center space is reserved largely for assembling and riveting. Rivet forges are installed underneath one of the crane runways, adjoining the flanging and forging machinery. A 15-ton Morgan crane spans the central bay, and its runway extends at one end, so as to give it access to two stake riveters, one of 8-foot and one of 12-foot capacity. In addition to the service rendered by this crane, jib cranes, most of which are provided with pneumatically operated trolleys, are installed on each column and adjoin each machine. These were built by the Morgan Engineering Co., Alliance, and render easy the placing of work in position on any machine.

The punching equipment, as heretofore stated, is unusually heavy and very complete. Long plates are punched by means of a heavy engine-driven punch fitted with a spacing table. A feature of the machinery in this shop is that all the heavier tools are driven by individual steam engines, the lighter ones being operated from a line shaft extending along the columns. The principal machinery installed consists of an automatic punch with an automatic spacing table, a

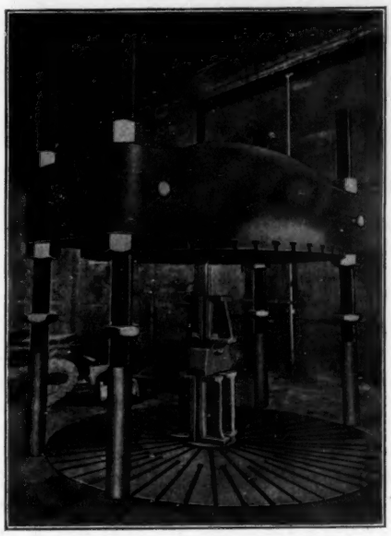

FIG. 1—FLANGING PRESS.

FIG. 2—INTERIOR OF STANDARD BOILER & PLATE IRON CO.'S SHOP.

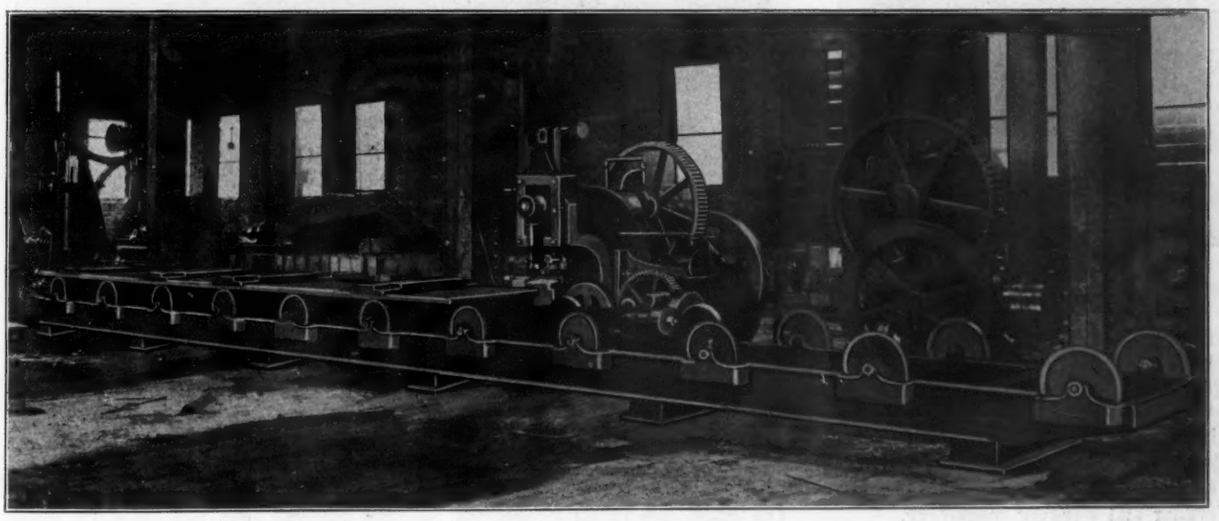

FIG. 3—AUTOMATIC PUNCH AND SPACING TABLE.

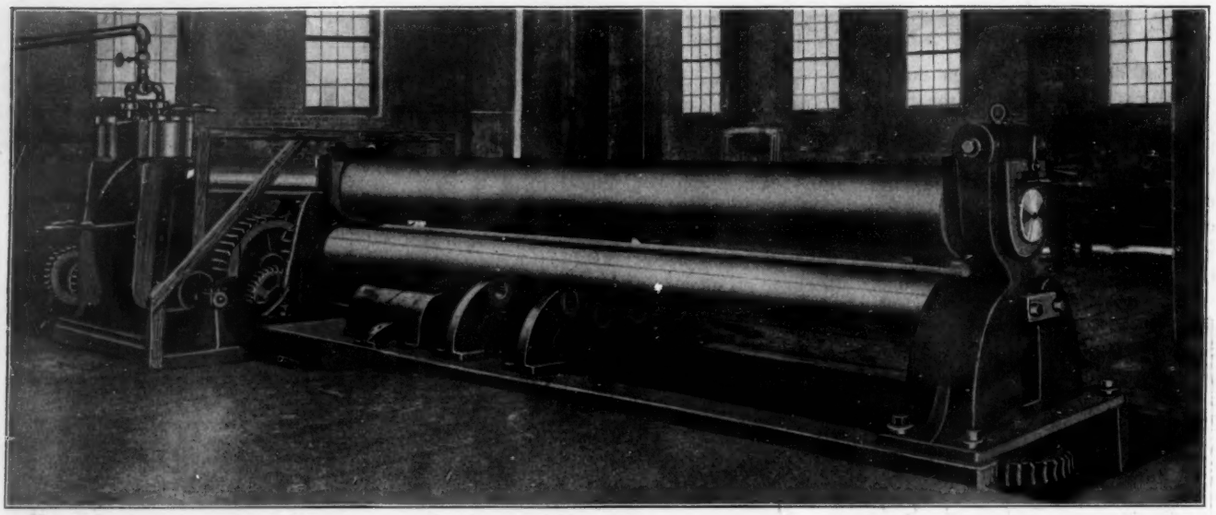

FIG. 4—ENGINE-DRIVEN BENDING ROLLS.

Hilles & Jones No. 6 engine-driven punch, together with two No. 2 punches built by the same company. A Cincinnati Punch & Shear Works punch and a Long & Allstatter horizontal punch complete the punching machinery. There is a Long & Allstatter No. 2 splitting shear and a Lennox rotary beveled shear installed. Bending is accomplished by means of a pair of No. 1 18-foot 6-inch engine-driven rolls and a pair of 10-foot belt-driven rolls. On the opposite side of the shop are a heavy hydraulic flanging press and a steam hammer. There are two furnaces adjoining this flanging press and a forging fire next to the steam hammer. Blast is furnished these fires by means of an engine-driven blower located in one corner of the shop on the same side as the forging and flanging machinery.

The power requirements of the shop are served by two 100-horsepower boilers in an addition at one end. These furnish steam for a 100-horsepower engine belted to the line and to a generator furnishing current for lighting. There are also an hydraulic pump delivering water to an accumulator 14 feet in diameter, and an air compressor which furnishes air for the air tools in the shop. There are air pipes, which lead to every point of the shop, with three hose attachments at each outlet.

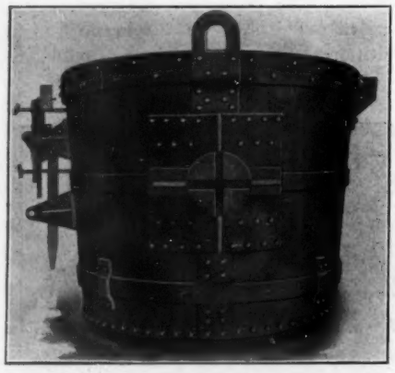

FIG. 5—THIRTY-TON LADLE.

In addition to boilers, the plant is capable of making all class of heavy plate work, such as blast furnaces, shells and stoves, ladles, tanks, oil cars, etc. Some of the company's products are shown in the accompanying illustrations.

The plant has direct connection to the Baltimore & Ohio railroad, by means of a side track, and through it access to the Erie and Pennsylvania lines. The officers of the company are W. A. Thomas, president; Dr. C. T. Swaney, vice president; E. J. Finney, secretary and treasurer; and E. A. Gilbert, general manager.

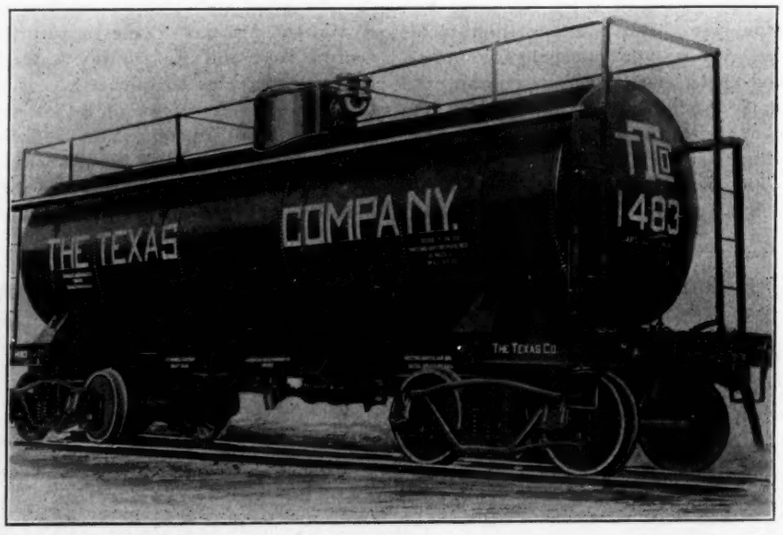


FIG. 6—OIL TANK CAR.

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**Bessemer Medal.**—The Council of the Iron and Steel Institute have awarded the Bessemer gold medal to Alexandre Pourcel, an eminent French metallurgist. The Bessemer gold medal is awarded annually for services to metallurgy and it is for his investigations in the manufacture of ferro-manganese and for his work on the thermal reactions involved in the manufacture of iron and steel that Mr. Pourcel, who was elected a member of the Iron and Steel Institute in 1879, now becomes the recipient.

# Gold Exports Depress Markets.

The highest average price of the year was reached by the New York stock market last week, about 30 points above the level of the corresponding week last year and 20 points below the record high mark of January, 1906. A somewhat disturbing factor was the exporting of $3,900,000 in gold which left New York Saturday for Paris. However, this had little effect upon the bank rate, which at no time went over 3 per cent, this showing no alarm among eastern financial interests, although the stock market suffered a momentary spasm of fright.

The opening of the market Monday was not active, and there was no decided price tendency. The government wheat report was not so unfavorable as the official estimates. Tuesday, a decidedly better tone was noted and prices closed higher. Both activity and strength characterized the usually low priced stocks Wednesday, and the close was firm and higher. The early advance of Thursday was checked late in the day by the announcement of gold being engaged for export to France. Steel stocks closed rather heavy, railroads advanced, and transcontinental roads filed notice with the Interstate Commerce Commission that their rates will advance 10 per cent west bound and 18 per cent east bound Jan. 1. The reassuring effect of the Gary dinner the night previous was somewhat lost Friday morning in the market by the announcement of $1,400,000 additional gold being engaged for export, causing some selling of stocks, and a lower market close. The majority of stocks closed higher Saturday.

Call loans ruled for the most part through the week at 2½ per cent, rising to 3 per cent on the gold export announcement, but only for a short time. The surplus reserves of the New York clearing house banks were shown to be $19,199,800, a decrease for the week of $3,983,900. This was a decrease of about $50,000,000 as compared with the maximum surplus of the year reported last June. The actual figures of the clearing house banks showed loans decreased $2,587,100; deposits decreased $10,478,500, and the percentage of actual reserve 26.24, a decrease of 0.29. Non-member banks and trust companies showed loans increased $19,097,200; net deposits increased $18,315,000, and the percentage of reserve 29.7, a decrease of 1.5. Commercial failures for the week were 312, compared with 287 the preceding week, and 322 the corresponding week last year. Shares were sold to the number of 4,818,749, compared with 5,738,174 the preceding week and 3,070,339 the corresponding week last year. Bonds, exclusive of government bonds, were sold to the amount of $38,129,000, compared with $37,655,000 the preceding week and $14,748,000 the corresponding week last year.

cent on preferred stock, payable Jan. 15; the United Shoe Machinery Co., the regular quarterly dividend of 1½ per cent on preferred and 2 per cent on common, payable Jan. 5; the Sloss-Sheffield Steel & Iron Co., the regular quarterly dividend of 1¼ per cent on preferred, payable Jan. 1; the Canadian Westinghouse Co., Ltd., the regular

## THE LEADING INDUSTRIAL SECURITIES.

| | Closing Quo. Dec. 12 | Changes in Week | Date 1908 Ann. M't'g | Stock Outstanding | Dividend Basis | Dividend Last Declared | Dividend Date Last Div. Pay. |
|---|---|---|---|---|---|---|---|
| Allis-Chalmers | 16¼ | +1 | Sept. 3 | 19,820,000 | | | |
| Allis-Chalmers pr | 52¾ | +3¾ | | 16,150,000 | 7 cum | 1¾ Q. | Feb., 1904 |
| American Can | 9¼ | ... | Feb. 3 | 41,233,300 | | | |
| Am. Can pr | 76⅜ | + ⅜ | | 41,233,300 | 7 cum | 1¾ Q. | Oct., 1908 |
| Am. Car & Foundry | 47⅛ | +1⅛ | June 25 | 30,000,000 | | ½ Q. | Oct., 1908 |
| Am. Car & Fdy. pr | 108 | — ¾ | | 30,000,000 | 7 n. c. | 1¾ Q. | Oct., 1908 |
| American Loc | 57⅛ | +1⅜ | Oct. 20 | 25,000,000 | 5 | 1¼ Q. | Aug., 1908 |
| American Loc. pr | 110 | + ⅛ | | 25,000,000 | 7 cum | 1¾ Q. | Oct., 1908 |
| American Ship | 56 | —1⅜ | Oct. 14 | 7,600,000 | 4 | 1 Q. | June, 1908 |
| American Ship pr | 105½ | ..... | | 7,900,000 | 7 n. c | 1¾ Q. | Oct., 1908 |
| Am. Steel Foundries. pr. | 47½ | .... | Oct. 6 | 15,810,000 | | | |
| Am. Steel Foundries(new | 40 | + ½ | | 14,247,400 | 6 cum | 2½ | Aug., 1904 |
| Barney & Smith | 40 | ..... | June 2 | 2,000,000 | 4 | 1 Q. | Sept., 1907 |
| Barney & Smith pr | 110 | .... | | 2,500,000 | 8 cum | 2 Q. | June, 1908 |
| Bethlehem Steel | 23 | + ⅛ | April 7 | 14,862,000 | | | |
| Bethlehem Steel pr | 51¼ | — ¾ | | 14,908,000 | 7 n. c. | ¾ Q. | Feb., 1907 |
| Cambria Steel | 39¾ | + ⅞ | March 17 | 45,000,000* | 6 | 1½ S. A. | Aug., 1908 |
| Cambria Iron | 47 | ..... | | 8,468,000* | 4 | 2 S. A. | Sept., 1908 |
| Chicago Pneumatic Tool | 25⅞ | + ⅜ | Feb. 17 | 6,145,800 | 4 | 1 Q. | Oct., 1907 |
| Colorado Fuel | 39⅝ | — ⅛ | Oct. 19 | 34,235,500 | | 3½ | April, 1902 |
| Crucible Steel | 8⅜ | + ⅛ | Oct. 21 | 24,578,400 | | | |
| Crucible Steel pr | 59 | +4½ | | 24,436,500 | 7 cum | 1 Q. | Dec., 1907 |
| Empire Steel | 6 | ..... | Feb. 26 | 1,254,770 | | | |
| Empire Steel pr | 47 | ..... | | 2,500,000 | 6 cum | 3 S. A. | July, 1908 |
| Fay & Egan | 90 | ..... | Feb. 18 | 1,000,000 | 6 | 1½ Q. | Nov., 1908 |
| Fay & Egan pr | 100 | ..... | | 1,000,000 | 7 cum | 1¾ Q. | Nov., 1908 |
| General Electric | 158 | — ½ | May 12 | 65,167,000 | 8 | 2 Q. | Oct., 1908 |
| Harbison-Walker | 16¾ | — ⅛ | Jan. 20 | 18,000,000 | | ½ | Oct., 1907 |
| Harbison-Walker pr | 80 | ..... | | 9,000,000 | 6 cum | 1½ Q. | Oct., 1908 |
| International Pump | 32 | +1¾ | June 2 | 17,787,300 | | 1 | April, 1905 |
| International Pump pr | 82 | +2⅛ | | 13,885,000 | 6 cum | 1½ Q. | Nov., 1908 |
| Lackawanna Steel | 48 | —2 | March 11 | 34,971,400 | | | |
| Lake Sup. Corp | 13 | + ⅛ | Oct. 7 | 40,000,000 | | | |
| New York Air Brake | 92¾ | —1⅜ | June 18 | 8,012,500 | 8 | 2 Q. | Oct., 1907 |
| Niles-Bement-Pond | 97 | ..... | Feb. 5 | 8,500,000 | 6 | 1½ Q. | Dec., 1908 |
| Niles-Bement-Pond pr | 100 | ..... | | 2,000,000 | 6 cum | 1½ Q. | Nov., 1908 |
| Otis Elevator Co. | 39 | ..... | March 16 | 6,156,600 | | 1½ S. A. | April, 1908 |
| Otis Elevator Co. pr | 94 | ..... | | 5,449,500 | 6 n. c. | 1½ Q. | Oct., 1908 |
| Penn. Steel | 50 | ..... | May 11 | 10,750,000 | | | |
| Penn. Steel pr | 104 | ..... | | 16,500,000 | 7 n. c. | 3½ S. A. | Nov., 1908 |
| Pittsburg Coal Co | 14⅛ | + ⅛ | Feb. 10 | 28,853,400 | | | Nov., 1906 |
| Pittsburg Coal Co. pr | 48⅜ | —1½ | | 27,030,800 | 7 c. | 1¾ | April, 1905 |
| Pressed Steel Car | 43⅛ | +4⅛ | Feb. 19 | 12,500,000 | | 3 | Aug., 1904 |
| Pressed Steel Car pr | 99¼ | + ⅛ | | 12,500,000 | 7 n. c. | 1¾ Q. | Nov., 1908 |
| Pullman | 172½ | .... | Nov. 11 | 100,000,000 | 8 | 2 Q. | Nov., 1908 |
| Railway Stl. Spring | 44 | +1 | March 5 | 13,500,000 | 4 | 2 S. A. | Oct., 1908 |
| Railway Stl. Spring pr | 101⅛ | — ⅛ | | 13,500,000 | 7 cum | 1¾ Q. | Sept., 1908 |
| Rep. Iron & Steel | 26⅝ | — ⅛ | Oct. 21 | 27,191,000 | | | |
| Rep. Iron & Steel pr | 86 | — ⅛ | | 20,416,900 | 7 cum | 1¾ Q. | April, 1908 |
| Sloss-Sheffield | 78 | — ¾ | March 11 | 10,000,000 | 5 | 1 Q. | Dec., 1908 |
| Sloss-Sheffield pr | 110 | + ¾ | | 6,700,000 | 7 n. c. | 1¾ Q. | Sept., 1909 |
| U. S. Pipe & Fdy | 30⅝ | + ⅜ | June 24 | 12,500,000 | 4 | 1 Q. | Dec., 1907 |
| U. S. Pipe & Fdy pr | 76½ | +1½ | | 12,500,000 | 7 n. c. | 1¾ Q. | Sept., 1908 |
| U. S. Steel | 54½ | ... | April 20 | 508,302,500 | 2 n. c. | ½ Q. | Dec., 1908 |
| U. S. Steel pr | 112¾ | + ⅛ | | 360,281,100 | 7 cum | 1¾ Q. | Nov., 1905 |
| U S. Steel 5s | 102¾ | + ⅜ | | 463,798,000 | 5 | 5 A. | ..... |
| Va. Iron, Coal & Cke | 64 | ..... | Nov. 17 | 9,073,680 | | | |
| Westinghouse Elec | 88⅛ | —1 | June 24 | 23,933,200 | 10 | 2½ Q. | Oct., 1907 |
| Westighouse Air Brake | 112 | +1 | Oct. 6 | 14,000,000* | | 2¼ Q. | Oct., 1908 |

Par value of shares, $100, except those starred (*), $50

### Copper Stocks.

**New York.**—Amalgamated Copper closed 83½, a net loss of 1¼.

**Boston.**—Butte Coalition closed 27, no change; Calumet & Arizona closed 118, a net loss of 1½; Calumet & Hecla closed 675, a net loss of 5; North Butte Mining closed 84⅛, a net loss of ⅞; Quincy Mining closed 95, a net loss of 1.

### Financial Notes.

The Otis Elevator Co. declared the regular quarterly dividend of 1½ per quarterly dividend of 1½ per cent payable Jan. 11; the Canadian General Electric Co., Ltd., the quarterly rate of 2¾ per cent on common, payable Jan. 1; the American Iron & Steel Co., the quarterly dividend of 1¼ per cent each on common and preferred, payable Jan. 1. The New York stock exchange authorities have decided to close Saturday, Dec. 26, so that the exchange will be closed from Thursday afternoon, Dec. 24, until Monday morning, Dec. 28.

# NEWS FROM MANY INDUSTRIES

**New Buyers:—**

The Chauvet & Coulter Co., New York City, machinery, with $75,000 capital stock, has been incorporated by Joseph J. M. Chauvet, John W. Coulter and James T. Dowdalls, 247 Center street, New York City.

The Henderson-Willis Welding & Cutting Co., St. Louis, has been incorporated by W. D. Henderson, P. F. Willis and Leonard Henderson, to manufacture and deal in tools, machinery, etc. The capital stock is $5,000.

The American Specialty Co., 194 East 154th street, Harvey, Ill., has been chartered to manufacture mechanical tools, machinery and devices, with $15,000 capital stock. H. L. Mills, E. M. Adams and Thomas C. Stobbs are the incorporators.

A charter has been granted to the Butler Electric Clutch Co., Yonkers, N. Y., to manufacture electric clutches, with $50,000 capital. The incorporators are: William W. Butler, Martin E. Thew, Yonkers, Clarence Alexander, 523 West 134th street, New York City.

Articles of incorporation have been filed by the Massachusetts Iron & Steel Co., Worcester, Mass., to manufacture and sell iron and steel, with a capital of $40,000. Victor D. Papineau is president and treasurer, and Ralph W. Hill, clerk, both of Webster, Mass.

The Radley Steel Construction Co., Hornell, N. Y., mechanical and civil engineer, manufacturer of engines, machinery, tools, etc., with $50,000 capital stock, has these incorporators: John J. Radley, Robert T. Brooks and William Worth Pease, 624 East Nineteenth street, New York City.

The National Separator & Machine Co., Boston, to manufacture and sell machinery of all kinds with $50,000 capital stock. John Lyman Porter, 991 Massachusetts avenue, Cambridge, Mass., is president and treasurer, and Henry W. Taplin, 132 St. Botolph street, Boston, is clerk.

A charter has been granted to R. Hamilton & Sons, Inc., Brooklyn, to manufacture brass articles, castings and models, with $12,000 capital stock. The incorporators are: Robert Hamilton, Joseph Hamilton, David A. Hamilton and John W. Hamilton, 24 Hicks street, Brooklyn, N. Y.

A charter has been granted to the Union Metallurgical Co., New York City, to manufacture alumina and aluminum, with $150,000 capital stock. The incorporators are William F. Cox, 135 Madison avenue; Stanley R. Ketcham, 5 Nassau street, and George L. Lewis, 27 Pine street, New York City.

The Bayonne Foundry & Machine Works, Bayonne, N. J., mechanical and electrical engineer and machinist, with a capital of $20,000, has these incorporators: William B. Stull, 55 Broadway, Bayonne, N. J.; Joseph F. Duggett, Charles Wesley Richmond, George Elfers, No. 7 Bodine street, Richmond, N. Y.

Articles of incorporation have been filed by the Wilkinson Valve & Supply Mfg. Co., Geneva, O., to manufacture, sell and deal in all kinds of valves, etc. The incorporators are Jacob Knupp, Geneva, O., George Wilkinson, Batavia, N. Y., and E. L. Squire, Wilmington, Del. The capital stock is $200,000.

With $250,000 capital stock, the International Iron Co., San Diego, Cal., has been incorporated for the purpose of owning, holding, selling and mortgaging iron mines and iron claims. The incorporators are Leslie J. Webb, Leroy A. Wright, Hugh G. Gwyne, Clyde L. Reed and E. V. Winnek, all of San Diego, Cal.

A charter has been granted to the Anti-Crucible Mfg. Co., St. Louis, Mo., to manufacture and deal in furnaces, etc., with a capital stock, fully paid, of $50,000. Those interested are: Peter B. Gibson, C. F. LeFavor and John E. Bishop, St. Louis, Mo., D. M. Jackson and John T. Aiken, Bloomington, Ill.

The Williams Brass Foundry, Brooklyn, has been incorporated to manufacture plumbing and sanitary fixtures and castings. The capital stock is $7,000, and the incorporators are: Nathan Rothstein, Liberty avenue, and Barbey street; Philip Cutler, 787 Bedford avenue; Samuel Cutler and Paul Cutler, 515 Park avenue, Brooklyn, N. Y.

The L. Helmuth Co., New York City, has been incorporated to act as sales agent for manufacturers, mills, etc., and to manufacture iron and steel and articles of same, with $40,000 capital. Those interested are: Oliver C. Field, 784 Broadway, Frederick S. Marsell and Herbert G. McLear, 402 West 136th street, all of New York City.

The Breckwoldt Mfg. Co., Newark, N. J., has been incorporated with $35,000 capital stock. The company will manufacture iron, steel, tin, copper, galvanized iron. G. Q. Dean, 1628 Amsterdam avenue; Fred Knowlton, 527 East 147th street, and A. F. Breckwoldt, 125 West Forty-fifth street, all of New York City, are the charter members of the company.

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**New Construction:—**

The Temple Iron Co. has replaced the old casting house at its furnace at Temple, Pa., with a new structure.

The Germantown Tool Works, 85 Armat street, Philadelphia, has invited estimates for a three-story factory building, 60 x 80 feet.

The Union Iron Works, Spokane, Wash., will build a new boiler shop, 80 x 100 feet, the building to be of brick and thoroughly equipped.

The N. & G. Taylor Co. has planned to construct a large warehouse at Cumberland, Md., for storing its manufactured tin plate products.

Capitalists of Wrightsville, Pa., have completed arrangements for the erection of an iron foundry along the river front, this being the fourth like industry in the borough.

The Great Western Smelting & Refining Co., Chicago, has taken out a building permit to construct a one-story brick foundry to cost $35,000, at 712-724 West Forty-first street.

The Western Steel Car & Foundry Co., Chicago, 136th street and Ontario avenue, has been issued a building permit for a one-story shop, estimated to cost $14,000.

The Interstate Sales & Construction Co., of Buffalo, which has leased the plant of the Coleman Iron Works at Savona, N. Y., is making plans for extending and increasing the business.

The Pennsylvania Railroad Co. has begun the construction of a new boiler shop 80 x 280 feet, of steel and brick, to be added to its shops at Renovo, Pa. The new shop will be equipped with hydraulic machinery.

The Empire Foundry, Oakland, Cal., has begun the erection of its new plant on Second street, its former site having been sold to a railroad company. The building will be 75 x 100 feet, and will cost $2,500.

The addition to the machine shops of Hudson & Sharp, Green Bay, Wis., is fast nearing completion, having been under construction since early in the summer. The new addition is 60 x 70 feet. A traveling crane has been installed to run the entire length of the shop, and as soon as the building is finished a heavy lathe will be in-

stalled. The front part of the building will be used more especially for floor working, most of the machinery used remaining in the rear of the building. The addition will make the Hudson & Sharp shops the largest in the city, and they will compare favorably with any machine shop in that part of the state.

The Clyde Iron Works, Duluth, Minn., is making three additions to its plant—one an iron shed, 40 x 50 feet, for storage purposes; another, 20 x 140 feet, for storing hoisting engines; and still another, 15 x 50, all fireproof.

C. D. Hillman announces that he has sold to Lapham Bros., of Pittsburg and New York, three acres of land at Boston Harbor between Tacoma and Olympia, Wash., on which the buyers expect to construct an iron works.

The work of rebuilding the nail mill of the Williamsport Iron & Nail Co., Williamsport, Pa., which was destroyed by fire Oct. 5, is going steadily forward. It is designed that there will be no partitions in the new building, but that it will be all one room.

The Cranberry Furnace Co., which blew in its stack at Johnson City, Tenn., Nov. 28, had completed some improvements to the plant. The stack had been relined, one of the three stoves had been extended 10 feet higher and an additional stove had been erected.

The Oklahoma School Desk Mfg. Co., Cherokee, Okla., has arranged for building an iron foundry and machine shop to be run in connection with its present plant. In the foundry the iron castings for the desks will be made. The building is to be 60 x 80 feet.

Announcement is made that the American Iron Works, Des Moines, Ia., has purchased 66 feet facing East First street and adjoining its property for $6,000. Plans are being drawn for placing thereon a brick building to cost probably $5,000, which will be largely used as a stock room.

The contracts for rebuilding the plant of the Columbus Machine & Foundry Co., Columbus, Miss., recently destroyed by fire, have been awarded, Lindewood & Prichet being given the contract for the brick work and C. M. Gibson the wood work. The plant will be larger than the old one and will cost about $25,000.

The Alabama Consolidated Coal & Iron Co. is making extensive improvements at its furnace plant at Ironaton, Ala. This includes a new condenser to cost about $50,000, and a new washer. A decision is being awaited as to the building of a pipe line and possibly a new pumping station.

The erection of the building of the Dundee Brass Mfg. Co., Dundee, N. Y., is being completed, the interior being finished this week. Machinery is to be installed at once, and it is expected that by Jan. 1 the company will begin the manufacture of brass fixtures.

The new tube mill of the Parkesburg Iron Co., Parkesburg, Pa., which has been in course of construction, is rapidly nearing completion. Recent trials of the gas producers and the Buckeye engine, which provides power for the electric generator, have proved satisfactory, and the plant will be making tubes shortly.

George W. Thomas and William G. Bridges have leased a strip of ground 45 x 150 feet fronting on the Pennsylvania railroad, at Johnstown, Pa., from John M. McConaughy, on which they plan to construct a foundry. With this end in view, they are organizing a stock company and propose to have their plant in operation in the early spring.

The American Concentration Co., manufacturing mining concentrating machines, has closed a contract through which it has come into possession of an old car works at Basic City, Va., to which it will move its plant from Joplin, Mo. The Virginia plant will be equipped with the Missouri plant's machinery, and will be ready for operating Jan. 1.

A meeting of the stockholders of the G. W. Fleming Co., Bradford, Pa., machinist and founder, was recently held to arrange for increasing the capital stock and adding to the size of the shop and foundry, this being necessitated by the large receipt of orders. The company manufactures light drill presses and brass fittings for plumbing and locomotive gage cocks.

The building of a new foundry plant at Vesper, Wood county, Wis., in which John Hayes and C. R. Goldsworthy are interested, is being actively prosecuted. The main buildings will be of brick, 60 x 100 and 60 x 200 feet, and the engine room, 35 x 45 feet. It is expected that the structure will be ready for occupancy May 1. The company will manufacture punches, shears and clevises.

The Frink Pyrometer Co., Columbus, O., is equipping a three-story building in North Third street with manufacturing machinery. The company will manufacture the Frink pyrometer, an instrument indicating temperatures from 300 degrees below zero to 5,000 degrees above zero. By this instrument, temperatures can be accurately registered by simply pressing a button from the office. F. J. Frink is treasurer and general manager of the company.

The two large buildings for the Ohio Seamless Tube Co., Shelby, O., the contracts for which were recently awarded to the McClintic-Marshall Construction Co., it is planned will be completed this winter. The main building will be 180 x 360 feet, and the second building will be but little smaller. This is the new enterprise projected by Shelby capitalists, who bought the site of the old tube plant from the National Tube Co., the buildings of which were burned last winter.

The new machine shop of the Smith & Winchester Mfg. Co., South Windham, Conn., is being completed, and will shortly be enclosed. The main building is one story, but of usual four-story height, 80 x 210 feet, of concrete, brick and steel with a gravel roof. A three-story brick and steel pattern building at the rear of the shop buildings is 50 x 90 feet; a blacksmith shop, 30 x 30 feet, adjoining, and an employes' wash room, 30 x 30 feet. The company manufactures laundry and paper machinery.

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**General Industrial:—**

The Advance Radiator Co., Syracuse, Ind., has increased its capital stock to $100,000.

The plant of the Southwestern Bridge Co., Joplin, Mo., is being advertised by the federal court for sale, Dec. 22.

The new plant of the Middletown Foundry Co., Middletown, Pa., poured its first heat Dec. 3, which proved successful.

The New Process Steel Co., Marshall, Mich., has increased its capital stock to $25,000 from $13,500, and a reorganization was also effected, F. F. and J. H. Dobbins selling their interests to S. C. French.

The International Harvester Co., Chicago, announces that the building which it occupied and which was recently noted as damaged by fire, was a leased structure which the Harvester company does not intend to rebuild.

The stockholders of the Gilmour Hogshead Machine Co., Owensboro, Ky., recently elected the following

officers: President, Samuel W. Thompkins; secretary and treasurer, John Gilmour; vice president, W. F. Axton, of Louisville; Richard O. Flynn Jr. and Silas Rosenfeld, of Owensboro, directors. The company will establish its office headquarters at Owensboro.

The Florence Iron Works Co., Florence, Colo., has been incorporated by A. M. Parnell, E. McDonald and W. E. Perkins, with a capital of $75,000, to take over a foundry and machine shop at Florence. The Florence gas engine will be the principal output of the company.

The E. E. Souther Iron Co., Wellston, Mo., has increased its capital stock from $60,000 to $100,000, to cover the cost of its new factory building recently completed. Its offices have also been removed to the new site at Kienlan and Hamberger avenues, Wellston.

The Snyder & Baker Stove Works, Belleville, Ill., advises that it is rebuilding the structure which was recently destroyed by fire. In addition, it is putting up a brick building 50 x 100, which will be used as a polishing, plating and buffing department. It plans to be ready for operating this new department about Feb. 1.

Mirabeau Sims, Samuel Caufman, and John Baldt, the latter two proprietors of the Penn Pattern Works, Front street and Concord avenue, Chester, Pa., have formed a partnership for the operation of a brass foundry. The firm is removing machinery from the lower floor of the pattern works, and will install brass working machinery there.

Robert Wetherill & Co., Chester, Pa., have secured contracts for about $100,000 of machinery, that were let by the Allentown Portland Cement Co., which is about to erect a cement plant at Evansville, near Reading, Pa. The cement company plans a similar plant for Allentown after the Evansville works are completed.

The A. O. Kehm Casting Co., Birmingham, Ala., advises that its foundry will be equipped for heavy castings, such as are used in blast furnace and mine work. The main building is 30 x 90 feet, with a lean-to on either side, and has a traveling crane, cupola of 10 tons per hour capacity, an electric power plant, and a thoroughly equipped pattern shop.

The Tropenas Steel Co., New Castle, Del., advises that the new building, 90 x 180 feet, which is now under roof, will be used at the beginning of operations for various temporary purposes, such as machine and pattern shop work and probably cleaning of castings. It is expected that the plant will be put into partial operation early in the new year.

The directors of the Capitol Lock-Nut & Washer Co., Columbus, O., are formulating a plan of re-organization of the company with a smaller capitalization. The company recently went into the hands of a receiver, but some members of the board of directors hold that the company is solvent. What steps will be taken have not been decided upon as yet.

Receivers for the Penn Shovel Mfg. Co., Warren, O., under the sanction of the federal court, have leased the plant to O. E. Krueger, M. H. Joy, Matthias and Robert Slater, all of Pittsburg, for a period of 90 days. The lessees will operate only the rolling mill department and if at the end of the period their plans work out, the plant will be turned over to them.

The Moline Plow Co., Moline, Ill., advises respecting its recent fire which partially destroyed the building of the Nebraska-Moline Plow Co., at Omaha, that the contract has been let for the re-construction of the building, with two additional stories, making the structures six stories high with basement, 132 feet square. A sprinkling system will be put in and the new building made modern in every way.

A. P. Schraner, 430-438 Prospect avenue, N. W., Cleveland, patternmaker, advises respecting his recent fire that, aside from damage by water on patterns and stock to the extent of $1,000, no serious loss was suffered. It is now operating with its full force of 27 men. While repairs were being made, Mr. Schraner accepted the generous offers of the Electric Controller & Mfg. Co., the Standard Pattern Co., and the Taylor & Boggis Foundry Co., of the use of their shops.

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**Trade Notes:—**

Thos. R. Heyward, Jr., of the firm of Thos. R. Heyward & Co., formerly Daft, Heyward & Co., Inc., Pittsburg, exclusive sales agents in that territory for Frank Samuel, Philadelphia, for the "Dinsdale" standard English 80 per cent ferro manganese, spiegeleisen and other alloys, has accepted a position with the firm of Walter-Wallingford & Co., of Pittsburg and Cincinnati, and will assist B. A. Wallingford Jr. and H. O. Price in the management of the Pittsburg office of that firm in the handling of their various agencies for pig iron and coke. Mr. Heyward still retains the agencies for alloys, etc. above mentioned and these will now be handled jointly through the firm of Walter-Wallingford & Co. Andrew J. MacEwan, of Thos. R. Heyward & Co. has also accepted a position with Walter-Wallingford & Co., and will act in the same capacity as heretofore with the first mentioned company.

John T. Cawley has taken charge of the Pittsburg office of the Ernst Wiener Co., New York, manufacturers of industrial railways and equipment, and is located at 911 Union National Bank building.

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**Fires:—**

The plant of the Columbus Bolt Works Co., Columbus, O., was damaged Dec. 7 to the extent of about $3,000, of which $1,500 was on the building and the remainder on machinery.

The office building of the International Harvester Co., Springfield, O., was damaged by fire Dec. 9, the loss being placed at $4,000.

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## TRADE PUBLICATIONS.

MOTOR TRUCKS.—The Curtis Motor Truck Co., Decatur, Ill., has distributed bulletin No. 1, describing Curtis motor trucks for electric service. The bulletin is devoted largely to a description of the shops of the company and the details of various operations, and to the process of manufacture. It also presents illustrations of a wide range of trucks of various types, together with specifications.

HYDRAULIC RAMS.—Columbia hydraulic rams are described in bulletin R-5, issued by the Columbia Steel Co., Portland, Ore. The bulletin shows the construction of the ram, presents tables of sizes and capacities, directions for setting up and operating, and presents a list of uses to which the ram is peculiarly adapted. The bulletin also includes hydraulic tables, showing the friction of water, discharge of weirs, etc.

STEEL LOCKERS.—The Berger Mfg. Co., Canton, O., is distributing a small booklet illustrating steel lockers for clothing, for use in factories, stores, mills, etc. Both the sheet steel and expanded metal device are described.

OILERS.—The Gem Mfg. Co., Pittsburg, Pa., is distributing catalog No. 5, describing the Gem line of oilers for bench and engine room use. An extensive line of oilers and oil cans for all uses are shown, together with a line of oilers and torches, also lamps for railroad use.

MILLING MACHINES, DIE SINKERS AND PROFILERS.—Milling machines, die sinkers and profilers are described in a handsome 40-page, 9 x 12-inch catalog issued by the Pratt & Whitney Co., Hartford, Conn. The catalog describes an extensive line of hand milling machines, together with various parts for the same, and a line of Lincoln milling machines, profilers, and die sinking machines, together with a No. 2 vertical spindle machine, which is only made to order. Specifications, tables of dimensions, and general descriptive matter comprise the subject matter of the text.